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When writing please mention DISEASES OF THE CHEST

DISEASES OF THE CHEST

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FOREWORD

This issue of DISEASES OF THE CHEST carries Missouri's message to the members of the FEDERATION OF AMERICAN SANATORIA and to the thousands of physicians who read this journal each month. It is the hope of the Committee on Arrangements under whose supervision this edition was arranged that the papers written especially for this issue and the other data contained here, will present a picture of what Missouri is doing in combating tuberculosis.

A program of the activities of the FEDERATION OF AMERICAN SANATORIA at the Kansas City meeting will be found elsewhere in this journal and it is the hope of the Committee on Arrangements that the physicians attending this meeting will participate in all of the activities planned by the committee.

W W BUCKINGHAM, M D
Chairman

Editorial Comment

MISSOURI THE Editorial Board of DISEASES OF THE CHEST is dedicating this issue to the physicians of the state of Missouri. They will be hosts to the Federation of American Sanatoria in Kansas City, May 11th to 15th.

We are delighted to extend this courtesy, and are proud, indeed, to present herewith articles by a few of the nationally known authorities who have pioneered in the fight against tuberculosis in the state of Missouri. These articles are all in keeping with the policy and aims of the FEDERATION OF AMERICAN SANATORIA and DISEASES OF THE CHEST, that is, to present interesting, non-technical treatises which will be helpful to

all physicians in the general practice of medicine, such as, Early Diagnosis, Case Finding, Modern Treatment, both for incipient and far advanced cases, Complications of Pulmonary Tuberculosis, Diseases of the Lungs simulating tuberculosis, etc. Each of these has its place in the propagation of the modern concepts of chest diseases.

It is our belief that such knowledge of tuberculosis should be kept working through the physician.

We wish to thank those physicians of the state of Missouri who have so kindly co-operated in making the Missouri issue of DISEASES OF THE CHEST interesting and helpful.

C M H

President's Message

With the meeting to be held in Kansas City on May 11th, the FEDERATION OF AMERICAN SANATORIA will have passed its first birthday. I want to express to all the members of the various committees my appreciation for the help they have given me as their first President. I feel we are very much to be congratulated on the showing made. It was not easy to bind together a new organization of national scope, however, this was made possible largely because of the principles of the Federation as decided upon at the meeting last August in Albuquerque, New Mexico.

The founders of the FEDERATION OF AMERICAN SANATORIA were very farsighted and possessed of a vision. I know of no other organization that is stressing the importance of early diagnosis to the family physician. It must be remembered that the family physician forms the first line of defense and if we can make him tuberculosis minded, as the efforts of Dr. Bloodgood and his co-workers have made them cancer minded, most of the battle against the tubercle bacilli will be won. This principle, I believe, is the reason for the life of our organization.

We made a most noteworthy step when a number of our members voiced their desire to the American Medical Association for a section on tuberculosis, this section to be a part of the parent organization. I want to emphasize the importance of a full membership at this meeting. I see it as the crucial session of the FEDERATION OF AMERICAN SANATORIA. If we can show just cause for this section, I am convinced that the American Medical Association will give it a permanent part on the program. While we have our National Tuberculosis Association, we realize very few physicians attend this meeting unless they are interested in our subject.

It is our hope that we can convince enough men, at the Section given to us in Kansas City, of the importance of our subject, that they may express a desire for the continuation of this Section at the future meetings of the American Medical Association. This, however, will not be done unless you show by your presence and interest that you believe it important.

Doctor A. J. Cohen, of the Educational Committee, has written to the Secretary of each State Medical Society asking them to give place at their yearly meeting for several papers dealing with tuberculosis and stressing the importance of early diagnosis. I believe this also can be made a regular part of such meetings. We have heard from most of the Secretaries telling us of their co-operation.

I predict for the FEDERATION OF AMERICAN SANATORIA a long and useful life. I am looking forward with much pleasure to seeing each member at Kansas City. Remember we depend on you and remember we cannot do without you.

William Devitt, President

FEDERATION OF AMERICAN SANATORIA

Allenwood, Pa.



EXECUTIVE OFFICE
STATE OF MISSOURI
JEFFERSON CITY

GUY B. PARK
GOVERNOR

April 9, 1936

Committee on Arrangements
Federation of American Sanatoria
Kansas City, Missouri

Dear Doctors

I am informed that the Federation of American Sanatoria is meeting this year at Kansas City, Missouri, May 11 to 15. I am further informed that in conjunction with this meeting, the official publication of the Federation of American Sanatoria, known as "Diseases of the Chest", is being dedicated to the State of Missouri, and it will portray through the printed word and by picture, the progress made by the State of Missouri in the fight against tuberculosis.

I deem it a privilege and a pleasure to express through the pages of this Missouri edition of "Diseases of the Chest" my best wishes to the editors, the Committee on Arrangements and to the physicians throughout the State of Missouri for the success of their meeting.

I extend a cordial welcome to visiting members of the Federation of American Sanatoria and may your stay at Kansas City be an enjoyable one.

Very truly yours,
GUY B. PARK
Governor

Adult Pulmonary Tuberculosis: Early Diagnosis

BY
SAM H. SNIDER, M.D., F.A.C.P.
Kansas City, Mo.

RECENT GAINS in our knowledge of tuberculosis show that the disease in most cases is truly incipient for many years before the manifestations of adult tuberculosis occur. Hence, the term "early diagnosis" correctly applied would refer to the diagnosis of childhood type tuberculosis. This diagnosis is best made by means of careful history, tuberculin test, and radiographic examination. For the purpose of this paper, however, the term "early diagnosis" will be used to apply to the earlier manifestations of the tertiary or adult type of infection.

History—In the diagnosis of tuberculous toxemia accompanying adult type tuberculosis, history is very important. The characteristic story consists of a triad of three couplets:

Cough and expectoration

Fever and tachycardia

Loss of weight and strength

When these symptoms are definite and persist over a period of several months the diagnosis of tuberculosis is definitely indicated unless the symptoms can be explained by some other disease.

The statement of the patient concerning fever and tachycardia should not always be accepted at face value for it is often necessary to use the thermometer several times a day over a period of some days to establish whether or not fever is present.

Loss of weight is considered definite when the patient has lost five percent or more of his normal body weight within three months or less.

Additional symptoms which may appear in the history and are strongly indicative of tuberculosis are hemoptysis (expectoration of a dram or more of bright red blood followed for some hours or days by blood-streaked sputum), night sweats, pleurisy with effusion, spontaneous pneumothorax, and pain in the lat-

eral regions in the chest. It must be remembered that tuberculosis frequently occurs without

producing definite pain, especially if the pleura is not involved. Care should be taken to distinguish between the lateral chest pains of pleurisy and the centrally located pains of tracheitis, cardiac disease, and aneurysm.

Altogether, the importance of history in the diagnosis can hardly be overemphasized.

Physical Examination—Physical examination is of great value only if it shows positive physical findings indicative of pulmonary disease. Among these are unilateral muscle atrophy above or below the clavicles and particularly about the insertion of the sterno-cleido-mastoid at its attachment to the sternum and clavicle. These differences in muscle tension are more readily seen than felt and must be studied with the patient perfectly relaxed in the erect position with the light shining symmetrically on the chest. I have repeatedly been able to make a diagnosis of chronic pulmonary tuberculosis by inspection of the chest when other abnormal findings could not be elicited. Rales restricted to the upper chest and accompanied by chronic toxemia are nearly always indicative of pulmonary tuberculosis, but their absence cannot be accepted as proving the absence of disease. Likewise, the absence of dullness merely indicates that there is no massive consolidation or effusion which would produce that dullness. Hence, negative physical findings have practically no value in excluding tuberculosis.

Roentgen-Ray Examination—Every patient with a suspicious history should be studied with the Roentgen-ray to determine whether his lungs have been invaded by tuberculosis. Infiltrations restricted to the upper half of the chest

and accompanied by chronic toxemia are nearly always due to tuberculosis. On the other hand, infiltrations restricted to the lower half of the chest are usually non-tuberculous and should not be diagnosed as tuberculous unless the sputum shows tubercle bacilli.

The Roentgen-ray is invaluable in the diagnosis of cavitation for by its use almost every cavity that is of any considerable size may be discovered, while not more than one-third of these cavities are discovered by physical examination.

It is important that the Roentgen plate be read by a man who is experienced in the interpretation of chest plates for this requires as much training as physical examination and erroneous diagnoses are frequently based on improper interpretation of the Roentgen plate. It is my opinion that the Roentgen-ray will discover at least twice as many cases of early pulmonary tuberculosis as can be discovered by physical examination. The chest clinician finds it an invaluable aid in diagnosis and in indications for treatment.

Sputum Examination—Sputum examination is of great value and should never be neglected, but we must be careful in interpreting sputum examinations that we do not make them the only basis of diagnosis. If the sputum contains tubercle bacilli the patient is practically certain to have pulmonary tuberculosis, but this finding of tubercle bacilli in the sputum should always be verified by a competent bacteriologist or a clinician who is familiar with the forms of tubercle bacilli and the methods of staining them. I have seen a diagnosis of tuberculosis made by a laboratory technician with less than two weeks experience in laboratory procedures, and the patient advised to change climate on the basis of this diagnosis, which proved to be erroneous.

We should never consider the sputum to be negative for tubercle bacilli until several specimens have been examined. I have seen a case in which tubercle bacilli

were found in the sputum only after more than fifty successive negative specimens had been examined. Concentration of the sputum by digestion and the centrifuge has aided in finding the bacilli when they were not present in great numbers, but greater emphasis should be placed on patience and persistence in the search of the smear for the organisms. If there is no ulceration present the sputum may be persistently negative for tubercle bacilli in the face of a fairly extensive infiltration and I do not consider the negative findings as having the great value which is to be attributed to positive findings of bacilli in the sputum. Bacilli in the sputum in considerable numbers usually mean that cavitation is present and this clouds the prognosis very considerably unless compression can be used.

Altogether, the two procedures which seem of greatest value in early diagnosis of adult pulmonary tuberculosis are careful history and a well made and well interpreted Roentgen-ray plate. Early diagnosis has improved greatly in the last few years but is still very important not only in saving the life of the individual but in protecting others against exposure to his infection.

Summary

- 1 Early diagnosis should now be changed to mean diagnosis of childhood type tuberculosis.

- 2 History is a very important aid in making the diagnosis.

- 3 Negative physical examination has little value in excluding pulmonary tuberculosis, but the presence of positive physical findings is a definite indication of disease.

- 4 Roentgen-ray studies carefully made and interpreted are indispensable to good work in the early diagnosis of tuberculosis.

- 5 Positive sputum examinations usually indicate an ulcerative process while a great many negative specimens are necessary for the exclusion of pulmonary tuberculosis.

Complications in Pulmonary Tuberculosis

TUBERCULOSIS, like syphilis, may involve practically any organ or tissue of the body. Since one of the

commonest sites of primary infection is the lung, tuberculosis, in any other part of the human body, may be considered a complication of pulmonary tuberculosis.

Pleurisy is one of the most common of its complications. Not infrequently the symptoms of pleurisy are the first to attract the attention of the patient or the doctor to the possibility of lung involvement. The commonest form is the dry adhesive form of pleurisy. Tubercles involve the pleura and, exudate which sticks the two pleurae together, becomes organized and thus firm adhesions are formed. The pleura may be involved in any part of the chest but is most commonly involved in the upper third of the lung. The discomfort is frequently of an aching character but at times may be very severe. Aching about the shoulders is commonly complained of. One must not overlook the fact however, that the pleurisy may involve the diaphragm and result in puzzling referred pains to the shoulder and neck or to the abdomen.

Thickened pleura and adhesions to the diaphragm can frequently be visualized by the Roentgen ray and if a partial pneumothorax exists, adhesions in other parts of the chest also. All methods of physical diagnosis must frequently be called into action to make the diagnosis. If the pleurisy is sufficiently acute and localized, immobilization with adhesive straps may be very effective. Otherwise, symptomatic treatment and the general care for any tuberculous lesion is indicated.

The acute type of pleurisy presents a very different picture. The fever frequently is very high, sometimes ranging above 105°. Other signs of toxicity are present and marked asthenia and very rapid emaciation occur. Very soon indications of an effusion appear and with the appearance of this the patient gets

BY
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relief from the severe pain. The effusion may fill only a part of the chest or it may fill the entire chest.

If there hasn't been an associated activation of a pulmonary tuberculous lesion, after a few weeks, the symptoms gradually subside and the effusion is usually absorbed. Tubercle bacilli may or may not be found in the straw colored fluid. However, before giving up the search, a guinea pig inoculation or culture should be made. If the effusion results in such disturbing symptoms as dyspnoea and cardiac embarrassment, it should be aspirated, otherwise one need not interfere, except for diagnostic thoracentesis.

Not infrequently an attack of pleurisy as I have just described is the first warning of the patient's pulmonary tuberculosis and if no other cause for the effusion can be found even though tubercle bacilli are not found in the fluid and a parenchymal lesion cannot be found in the lung, it is best to treat these patients with prolonged bed rest as though we were sure we were dealing with a tuberculous lesion. Statistics show that a high percentage of such cases do eventually come down with pulmonary tuberculosis.

Purulent effusions occur most frequently with pneumothorax. It is especially likely to follow a spontaneous pneumothorax when the pleural space becomes contaminated with air and secretions from the bronchi.

It may, however, occur without a pneumothorax. A tuberculous empyema may follow an extensive tuberculosis of the pleura. Tuberculous patients are liable to non tuberculous respiratory infections during epidemics and may develop a non tuberculous empyema without lung rupture.

Tuberculous empyema are of two distinct types. In the one, symptoms may be very few or almost entirely absent. In the other, the patient is very toxic and

rapidly loses ground. Patients with the non-toxic type may carry the pus for years without serious symptoms.

Empyema whose bacterial flora is non tuberculous also vary in the degree of toxic symptoms produced according to the virulence of the causative bacterium but as a whole, cause more severe toxicity. Treatment varies from simple aspirations to the most radical surgery depending on the type of infection. A further discussion of treatment cannot be attempted in so limited a paper as this.

Spontaneous pneumothorax frequently complicates tuberculosis of the lung. It also is often the first important indication of lung involvement. It should always remind one of this possibility and cause one to make a diligent search for pulmonary tuberculosis. There are however other causes of spontaneous pneumothorax and we know today that this accident does not justify a diagnosis of pulmonary tuberculosis if all other evidence is wanting.

The immediate treatment is directed against shock and if the heart and respiration are much embarrassed, air must be removed. We must remember, however, that the chest will soon fill again and air removal is only a temporary expedient to allow the patient time to adjust to the pressure. Sometimes the case demands that an open canula be left in the chest wall. This, however, is likely to result in a serious empyema and should be reserved only for a last resort. Spontaneous pneumothorax is a very serious complication and frequently proves fatal.

If empyema supervenes it must be treated as the virulence of the infection indicates.

Tuberculous laryngitis is almost always secondary to pulmonary tuberculosis. Its incidence statistics vary from 5% to 50% probably depending mostly on the extent and virulence of the pulmonary condition and the zeal with which the physician searches for it in his patients. While a laryngeal involvement adds much gravity to the prognosis, it by no means

spells a hopeless prognosis as was formerly thought. It usually progresses as the lung condition progresses and improves as that condition improves. Therefore, the first consideration in treatment involves those measures of rest and general hygiene employed in pulmonary tuberculosis. Voice rest should be advised and in cases with severe ineffectual coughing, measures should be instituted to control this as severe coughing certainly is not conducive to lung or laryngeal rest. The number of antiseptics used by different men evidences their lack of specificity. Some men report rather good results with local ultraviolet therapy. We use it extensively at Koch Hospital and believe it at least makes for greater comfort for the patient. Benefit from the actual cautery if properly used is claimed by many. It must be used cautiously and should be avoided in acute toxic cases.

Relief of pain sometimes becomes a very vexing problem. Such drugs as Orthoform and Anesthesin may be helpful. Cocaine is often needed. Blocking of the superior laryngeal nerve will give relief in many cases.

Tuberculosis of the intestinal tract is a very common serious complication of Pulmonary Tuberculosis. As in the case of laryngeal tuberculosis, it was formerly thought to render the prognosis practically hopeless. We know today, however, that many tuberculous ulcers of the intestine do heal and that if the pulmonary condition is controlled, the intestinal lesions in many cases will heal. We have many cases on record at Koch Hospital who recovered from their intestinal tuberculosis when they overcame their lung condition. I have in mind one patient who had a basal pulmonary tuberculosis, developed a spontaneous pneumothorax, a tuberculous empyema and enteric tuberculosis. Her empyema was replaced by oil, her pneumothorax overcame the pulmonary tuberculosis and with ultra violet and other therapy, her intestinal tuberculosis healed and she has been clinically well for several years.

As to the diagnosis of enteric tuberculosis, it is necessary for us to use all aids at our disposal. Some workers are very enthusiastic about the value of x-ray and others feel it isn't a very valuable aid. Its value, as is the case with many other diagnostic aids, is directly proportional to the care and industry with which it is employed. The symptoms which consist of pain and tenderness especially in the caecal region where most ulcers occur, gaseous distension, anorexia, increased peristalsis with diarrhoea or diarrhoea alternating with constipation are a great aid and usually taken with the x-ray findings will make the diagnosis. Although the most effective treatment for enteric tuberculosis is that directed against the pulmonary lesion which is its source, nevertheless, ultraviolet therapy and a diet rich in vitamins A and D, as cod liver oil and tomato juice, frequently are very beneficial and at times appear to act almost specifically. Coarse foods leaving an irritating residue should be avoided and constipation treated dietically and with mineral oil.

Tuberculosis of the kidney is by no means an uncommon complication of pulmonary tuberculosis. In advanced cases symptoms resulting from ureter obstruction or bladder irritation are common, but in a tuberculosis institution, a careful check of the urine followed by cystoscopic examination when indicated will find some practically silent or symptom free cases.

I believe the best opinion still holds that given a unilateral tuberculosis of the kidney, nephrectomy is the treatment of choice provided the pulmonary condition is not so bad as to contra-indicate it. Helio-therapy is praised by some phthisiologists as very helpful and should be tried. As with other complications, it is of utmost importance to treat the source of the trouble in the lung or wherever it be.

Secondary infection of the vas-deferens and epididymus are not uncommon complications of pulmonary tuberculosis.

One must always keep in mind that tuberculous meningitis and generalized tuberculosis result more frequently from surgery for tuberculosis of these organs than from surgery on tuberculous lesions elsewhere when deciding whether or not to interfere surgically. Ultra-violet therapy may be very beneficial for tuberculous sinuses from these organs. Surgical excision may be advisable but one must weigh carefully all considerations in each individual case before deciding upon an epididymectomy or vasectomy.

Generalized miliary tuberculosis and tuberculous meningitis are complications resulting from rather large doses of tubercle bacilli being liberated in the blood or lymph stream as when a caseous gland or caseous lesions elsewhere rupture into a blood vessel. The prognosis is very grave and in the case of tuberculous meningitis practically hopeless. It occurs much more frequently in children and young adults. Since very little can be done in the way of treatment other than symptomatic and supportive treatment, our greatest efforts should be expended on prophylaxis, caution must be exercised in surgery and the handling of accidents involving tuberculous foci.

Gangrene of the lung sometimes occurs as a complication of pulmonary tuberculosis. When one considers the mass of non-tuberculous secondary infection in a lung with extensive tuberculosis, it is surprising that it does not occur more frequently. It is usually easily recognized by the extremely septic condition of the patient plus the very fetid odor of the breath and sputum. While fetid sputum does not always mean gangrene, yet the picture of shock and extreme sepsis together with the fetid sputum rarely leaves much doubt as to the diagnosis. Certain types of spirochete and fusiform bacilli found in pyorrhoea and other mouth conditions are frequently associated with lung gangrene and perhaps are frequently the causative factor.

We must not overlook the fact that a pulmonary tuberculosis may be the pre-

(Continued to page 34)

The Use of the Tuberculin Test In Private Practice

BY

HERBERT L. MANTZ, MD
Kansas City, Missouri

A FEW YEARS AGO the tuberculin test was practically abandoned. It was considered of no value except when negative and only in the age group below ten was it negative often enough to differentiate. The extensive surveys that have been made during the last fifteen years have shown that it does possess much value. If it is of value in group surveys it must be of value in general practice.

Of the various ways of getting tuberculin into contact with deeper layers of the skin, the intradermal injection of tuberculin dilution is the surest and best. This test is called the Mantoux. The Von Pirquet, or scratch method, is not quite as good as the Mantoux.

The materials in use vary. The physician who makes only an occasional test will find it better to use the scratch Von Pirquet method of test, using concentrated Old Tuberculin which does not deteriorate very quickly. If a large number of tests are to be made, dilutions of old tuberculin can be prepared. Stock preparations can be purchased from pharmaceutical houses. These consist of measured amounts of O.T. undiluted and vials of diluent. Using this set, a series of dilutions can be prepared. For the first test use a 1-10,000 dilution. Inject 1/10 of a c.c. of the dilution, containing 1/100 mg. of O.T. If this is negative, repeat, using 1-100 dilution, 1/10 of a c.c. containing 1 mg. of O.T. If only one test can be made, use 1-1000 dilution, 1/10 of a c.c. containing 1/10 mg. The test is read 48 hours after injection. The area of edema is measured and the test is recorded in terms of 1,2,3,4 plus. Roughly this corresponds to the diameter of the edematous area in centimeters, except that a 4 plus reaction is one in which blister or necrosis occurs. No control is necessary. A new material, Purified Protein Derivative, has the advantage of greater uniformity, but is more expensive

than Old Tuberculin and, I believe, has little or no practical advantages.

A positive tuberculin test means former infection by the tubercle bacillus. Types of bacilli are not differentiated e.g. human and bovine types react to either tuberculin. It does not give any information as to severity of infection, activity of lesion, length or time of infection or the prognosis. This test tells us one thing, and that is, that at some previous time tubercle bacilli of some type have entered the body. There is no other way to tell positively when infection has occurred. There are no signs or symptoms that can be depended upon to tell us when bacilli first gain entrance to the body or even to call attention to their presence. The tuberculin test does reliably divide our patients into two groups, the infected and non-infected. It is the best way to quickly screen out the tuberculous from the non-tuberculous.

A negative test is evaluated as either false or true. False negatives are those in which the testing material is too weak or not good, the period of incubation has not elapsed, or the patient is so ill that allergy is depressed. This latter may be due to tuberculous infection or to other infections such as measles. Remedies for false negatives are to use good material, and if dilutions are used, make up fresh ones every month. Always retest every negative patient six months or a year after the first test. If the patient is overwhelmed by a tuberculous infection, other methods of diagnosis are available. Should other infections be present, retest when patient has recovered. The negative tests mean the patient has never been infected by the tubercle bacillus or that the infection has healed so well that allergy is no longer present. We see many patients, especially adults, that are negative to small doses of tuberculin and yet have calcified areas in the lungs. These patients usually

react to larger doses. Very few patients will be found that have healed their first infection and are tuberculin negative.

In large surveys, a group is assembled and every one in the group is tested. In private practice one can do the same thing or can discriminate a bit. Eventually, I believe, we will do tuberculin tests as routinely as we do Wasserman tests, or blood counts, etc. It has long been known that the closer the contact to a source of bacilli the more liable is infection. A carefully elicited history will reveal absence or presence of contact and tests may be made only on contacts. Surveys have shown that a very large number of cases occur in persons who say they have no knowledge of any previous contact. It seems to me that the only thing to do is to use the test routinely, even in private practice. Although it is best to do routine tuberculin tests at all ages, the interpretation of the results and the follow up must vary according to the age.

The first group is from birth to about age three. There are two ways of attacking this problem. First there is the test of the parents of which more will be said later. The time will surely come when each father and mother will know positively whether or not they are or may likely become a source of infection for their children. At present, the door is usually locked after the horse is gone, e.g. after the child dies of tuberculous meningitis. The parents are then examined and one or both found to have a chronic proliferative pulmonary tuberculosis. Careful examination sooner would have saved the child's life.

The second attack is by way of the child. Making routine tuberculin tests, the pediatrician or family physician discovers the child to be a positive reactor. A child infected before age three usually becomes so from some one close at hand, relative, servant, or intimate family friend. The positive reaction calls for a careful inspection of these close contacts, tuberculin tests first, followed by films of the positive reactors. We strongly advise

every family employing domestic help to have these employees examined. This is seldom done. Many tuberculous women, some knowing that they are tuberculous and some not, seek employment caring for children. The only way employers can protect themselves is to have the prospective employee examined thoroughly and to pay for this examination. The money they spend may be saved a thousand fold.

At one time it was considered that children infected below age three had a very unfavorable prognosis. This is certainly far from the truth. Tuberculous children, from birth to age three, fall into two groups. The first group is composed of those obviously ill with acute types of the disease. For them the prognosis is extremely unfavorable and when tested with tuberculin, they are often negative. The disease is so overwhelming that allergy is depressed. The second group react to tuberculin, yet appear to be normal children. For this group the immediate prognosis is very good. As a rule, the first infection proceeds to heal by resolution, calcification, localization and ossification.

The next age group is three to puberty. The number of children found to be infected in middle western states varies according to locality but is seldom over 25% and in most communities 10% or under. As the age increases, contact sources are harder to find, but should be looked for just as they were in the younger classes.

There are two reasons for looking for tuberculous infection in this second group. The first and lesser reason is to look for active cases among adult contacts. This is not so important because as age increases the child has so broadened his contacts that infection may come from extra family sources and tests have shown us that we find few adult cases from testing these older children.

Second, we want to know which children have been infected so that an attempt can be made to protect them against adult types of this disease. To date no one is exactly sure how to do this. At present, many of these children are cared for in the open air school systems, preventoria,

etc. It is difficult to check the efficacy of this type of treatment. The proof of this form of treatment is in later life. The immediate prognosis is good. We rarely see active pulmonary tuberculosis before puberty. The few exceptions are usually in the Negro, Mexican or Indian. Children of this group seem to handle the first infection very well. The future prognosis is not so rosy. Approximately 10 to 15% of these children are said to develop adult types of the disease by age 21. At the present time we have no criteria by which we can tell whether or not this or that child is liable to develop clinical disease in later life. We do not know positively whether the child must receive added or superinfection or whether a spread may occur from the first infection. While members of the profession disagree on how this second infection occurs, all agree that the second infection is dangerous because the first infection has produced hypersensitiveness against tuberculin. It is agreed that this hypersensitiveness or allergy, as it is called, has some protective powers. The exponents of vaccination, the followers of Calmette believe that there is so much value in this as a protection that they actually produce the first infection types of tuberculosis with B C G. It is believed by most of the American schools that B C G is dangerous, that the first infection with tubercle bacilli is not a desirable thing, that it should be postponed as long as possible and that if it does give some protection, its liability is greater than its asset value. Therefore, the groups to puberty are tested in order that we may watch the infected children through the years of sexual development and early maturity, and try to prevent, if possible, adult types of the disease and failing this, to at least diagnose the infection in minimal stages.

Tuberculin testing in adult groups makes early diagnosis possible. It is true that as age advances the percentage of tuberculin reactors rises. These figures will undergo change as from year to year new generations growing up in a world of lessening tuberculosis infection come

of age. Every year the tuberculin test will become more valuable. Diagnosis of tuberculosis usually is made because the patient notices certain symptoms and comes to a physician for relief. By the time this happens the disease is usually far advanced. The new and modern way is to make a diagnosis before symptoms occur. Surveys have shown that the x-ray film is the best way to make very early diagnoses. The tuberculin test picks out the cases for X-ray. Cases diagnosed before symptoms appear are more amenable to treatment. Hospital costs are lowered to such an extent that the money saved more than pays for the many x-ray examinations.

A word of warning should be given here. Every adult tuberculin reactor certainly does not have actual clinical disease. As a matter of fact, relatively few will develop actual disease. There are many diseases that have onsets similar to tuberculosis so that a differential diagnosis is not easy. The lungs are the site of so many infections that it is almost impossible to define a normal roentgenograph of the chest. There is also a great deal of difference in x-ray equipment. The best apparatus on the market today is none too good. In spite of this films are being made with very inferior machines, films that cannot be read accurately and which may do more harm than good. It must be realized that the early diagnosis of tuberculosis is not easy, and requires a great deal of experience in film interpretation.

At the present time a committee of the National Tuberculosis Association is working to standardize equipment. A great deal of work has been done to standardize tuberculin. The Purified Protein Derivative is one answer to this. At present, it is priced too high, but greater production should reduce the price.

Summary

The tuberculin test is the most effective screen to separate non-infected from infected tuberculous patients.

The test is used in children first to ascertain infected children, and second to

(Continued to page 34)

Primary Carcinoma of the Lung

IN A RECENT PAPER C I Allen (1) states that approximately one hundred and fifty papers dealing with primary carcinoma of the lung have appeared in the literature within the past three years. A fair number of these papers have dealt with the clinical features, whereas only a short time ago most of the writers were concerned with the pathologic picture. This increased clinical interest is very evident. Reports of patients treated during the past few years have demonstrated that in some instances primary tumors of the lung are operable. There is no doubt but that the number of patients diagnosed as suffering from primary malignant disease of the lung has rapidly increased.

Graham and Singer (2) quote Jung-hams in stating that primary carcinoma of the lung, which always arises in a bronchus, constitutes between 5 and 10% of all carcinomas. Obviously these figures indicate that considerable study should be devoted to this disease in order to make an early diagnosis and to determine suitable treatment. Unfortunately, the onset in many cases is insidious, and in some cases it appears to arise in the lungs of individuals who have for many years been the victims of such chronic pulmonary diseases as bronchitis and tuberculosis. However, in others the condition arises in individuals who have a history peculiarly free from illness in any form. Furthermore, the enormous improvement in thoracic surgery justifies the hope that in the near future many patients now doomed when the diagnosis is made may be enabled to recover completely or at any rate look forward to a distinct prolongation of life.

Very little can be said in regard to etiology. Primary carcinoma of the lung is much more common in men than in women. Edwards (3) reports a series of 73 cases, 53 of whom were men and 20 women. In Edwards' (3) series the old-

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est patient was 69 and the youngest was 26 years of age. The average age was approximately 49 years.

Jackson and Konzelman (4) report a series of 32 cases, 7 males and 25 females. The average age of the men was 52.3 years and of the women 34.1 years. In the cases I have seen the average age has been low. Two females have been under 21 years of age and two men have been under 40 and none have been more than 60 years of age. The lesion was on the right side in 33 of the cases reported by Edwards and on the left side in 40 cases. In Jackson's series 23 were right and 9 left. These tumors occur more frequently in the lower lobes than in the upper lobes according to the case reports. As far as can be determined at present, occupation does not appear to be of great importance.

Edwards (3) reports that cough was present in all of the 73 cases except one. All of Jackson's and Konzelman's (4) 32 cases had cough as a predominant symptom except five. Rabin and Neuhof (5) do not report their 250 cases in detail, but state that cough and hemoptysis is caused by ulceration of tumors into the larger bronchi. Hemoptysis is reported to occur in a large proportion of all cases. Edwards (3) reports hemoptysis in 87.7% of his series. Hemoptysis, therefore, occurs in a greater percentage of cases of pulmonary malignancy than of pulmonary tuberculosis.

Sixty-four per cent of Edwards' (3) cases had a mucoid frothy sputum. If necrosis and infection has occurred the sputum may be purulent and resemble that seen in pulmonary abscess or bronchiectasis.

Dyspnoea was present in 74% of Edwards' (3) cases and he does not believe that it depends upon the amount of lung involved. He thinks it may be due to involvement of the bronchus or of the vagus. Dyspnoea in the cases I have seen

has been fairly well in proportion to the amount of lung put out of action Rabin and Neuhof (5) state that pain is the most common signal symptom of the tumors of the smaller bronchi while Edwards (3) reports pain as being present in only 60% of his cases The pain is usually caused by the growth extending to the pleura or extrapleural structures

Physical signs vary according to the location of the growth When it is in a main bronchus to a lobe the signs will usually be those of bronchial obstruction causing atelectasis of the involved lobe. In the later stages there may be evidence of a secondary pleural effusion The effusions are often serous early, but usually are blood stained or contain a great amount of blood Physical signs may be absent when the growth is located in the peripheral portions of the lung or consist of slight localized dullness In the later stages the growth infiltrates the chest wall and produces a very flat, solid percussion note—slightly different from the note over fluid, also the dullness may extend over beyond mid line, although the heart is not displaced Clubbing of the fingers may be present.

In those carcinomas blocking the main bronchi or the commencement of the secondary bronchi the x-ray picture is dependent on the presence or absence of bronchostenosis Infiltrations most dense at the lung root and extending in fine streaks and nodules to the periphery may be seen Enlarged mediastinal lymph glands may be present Growths arising outside the main bronchi may produce a well circumscribed shadow The non-circumscribed tumors of the smaller bronchi usually present the appearance seen in unresolved pneumonia When the growth extends to the periphery careful inspection may show more or less destruction of a rib

Bronchography is mentioned by all authorities as being essential in the diagnosis of bronchial neoplasms (Radio-graphic examination after introduction of lipiodol) It will give positive evidence of obstruction of bronchi It will

also show partial obstruction caused by a narrowing of the bronchial lumen from either within or without

Those who are interested primarily in the medical or surgical aspects of chest diseases seem to be as enthusiastic as the bronchoscopist as to the value of bronchoscopic examination in bronchial carcinoma The cardinal indication for bronchoscopic examinations is clinical or roentgenologic evidence of bronchial obstruction (a wheeze or an area of obstructive atelectasis or obstructive emphysema), and in no connection is it more valuable than in the early diagnosis of bronchial carcinoma (4) Several important observations can be made by this method 1 A definite nodular growth may be seen from which a specimen can be removed for microscopic examination 2 Narrowing due to submucous infiltration by growth or that due to pressure by a tumor outside the bronchus may likewise be determined and 3, broadening of the carina due to enlarged mediastinal lymph glands can be visualized Edwards (3) thinks that bronchoscopy should be performed on the majority of patients who have had hemoptysis and from whom tubercle bacilli cannot be found in the sputum, especially if they are middle aged The same view is held by other authorities

The introduction of air into the pleural space may help to distinguish tumors of the inner chest wall and pleura from those arising in the pulmonary tissue and, therefore, may be of considerable value if the question of operation is being considered Thorascopy may give evidence of secondary involvement of the pleura, a condition which would contraindicate any attempt at radical operation Pleural effusion, when present, may be examined by Mandelbaum's method and enable a positive diagnosis to be made This method comprises separation of the cellular content of the pleural fluid by centrifugalization and hardening the deposit by formalin after which it is prepared for microscopic examination This

method can also be used for sputum examination

Exploratory thoracotomy may be used if all other methods do not enable a diagnosis to be made

Much difficulty is being experienced in arriving at a practical classification of carcinoma of the lung. Formerly the classification was based on the cellular structure of the tumor. All are agreed that practically all pulmonary carcinomas originate in a bronchus and many believe that all types are derived from the same cell, namely the undifferentiated basal cell of the bronchial mucosa. All seem to believe that the location of the tumor is of great importance when treatment is considered, either radium or surgery, and therefore should be considered in classification. Tuttle and Womack (6) think their investigations show that tumors located in the large bronchi are less malignant and offer a better chance for cure by removal than those arising from the smaller bronchi. On the other hand Rabin and Neuhof (5) think their research has shown that peripherally located tumors are more likely to be circumscribed and that regional lymph nodular involvement occurs late and is limited. They, therefore, believe that the peripherally located tumors offer the best chance for surgical cure. Edwards (3) states that it is almost invariably impossible to perform a lobectomy on any patient in whom the growth can be seen with the bronchoscope, and in these cases the only radical operation that can be considered is total removal of the affected lung.

There are many pulmonary diseases which cause symptoms and objective findings similar to those of cancer of the lung. Lung abscess is often difficult to differentiate. The growth causes bronchial obstruction and infection occurs in the obstructed portion of the lung producing an abscess or gangrene. For this reason, the cause of lung abscess should always be determined if possible. Pulmonary tuberculosis is often diagnosed when a bronchial malignancy is present.

Differentiation depends on the sputum findings and if sputum is negative for acid fast organisms, a careful consideration of all subjective and objective findings is in order. As the growth may cause about the same symptoms and findings as a foreign body in a bronchus, the presence of a foreign body should always be ruled out. The acute symptoms that occur at the onset of necrosis and infection of the growth may stimulate pneumonia. A chronic bronchitis manifested chiefly by cough, especially a cough with a tendency toward spasmodic attacks may be caused by a carcinoma in a large bronchus without obstruction. The likelihood of a new growth is increased if hemoptysis is present. Positive diagnosis must necessarily depend on biopsy of a specimen obtained by the bronchoscope, biopsy of a regional lymph gland or on the operative or autopsy findings.

During the past 4 years Edwards (3) has been implanting radon seeds in bronchial tumors. The holders of radon seeds remain in place for seven days, the growth receiving an amount of gamma radiations equivalent to 1,795 milligram hours of radium. In general he states the end results as regards cure are poor owing to the late stage in which the treatment is instituted. In a large proportion of cases the local growth disappears. He thinks there is as definite a hope of curing them by irradiation as there is in early carcinoma of the tongue. He reports one patient treated by this method in 1931 who was well in May, 1934, there being a white scar on the bronchial wall where the growth was formerly located. Several patients are alive from periods of 2 months to over a year. He also inserts the radon seeds by thoracotomy in some cases when the growth is not visible through the bronchoscope.

Many cases of pulmonary malignancy have been treated by surgical removal of the affected lobe or lobes during the past few years. Edwards (3) reports 14 such removals. Rabin and Neuhof (5) report 5 cases, one of whom was living at the

(Continued to page 38)

Surgery in Pulmonary Tuberculosis

A FEW YEARS ago the idea of operating for pulmonary tuberculosis in the minds of most of us

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was indeed a colossal undertaking. Unfortunately, there are still a few Doctors who have not been able to accommodate themselves to this recent trend in the treatment of pulmonary tuberculosis, and these few die hards have not accepted surgery until only in the far advanced, hopeless cases, and then point their fingers to the surgeon with a great deal of smugness at the poor results obtained. This lack of understanding is due in a large measure to an improper comprehension of the meaning of surgery in pulmonary tuberculosis coupled with a poor understanding of the physiological principles involved in the treatment of pulmonary tuberculosis.

There is nothing new or startling in the treatment of pulmonary tuberculosis by surgical means. We only attempt to bring about the maximum degree of rest to the diseased lungs by the institution of surgical procedures such as the cutting of nerves, muscles, tendons and ribs to bring about relaxation and rest of a lung. These procedures can be made permanent or temporary depending upon the individual case at hand.

We have all seen cases where the inter-spaces are narrowed and ribs pulled in, diaphragm pulled up, and the heart and mediastinum pulled far into the diseased hemithorax. A NATURE THORACOPLASTY. These far advanced attempts of nature to heal by extreme fibrosis and traction are seen rather infrequently and we now do not wait for a case to become this far advanced, but institute procedures which will bring about the same desired results. For example, if we were dealing with a tuberculous joint we would immediately put it in a cast or stabilize it by some operative procedure, and not merely tell the patient to limit the use of that diseased member.

If we look upon the lung as being an

elastic organ which is capable of changing its shape and size several times during a minute we would

realize how futile bed rest, the use of binders, shot bags and posture are in decreasing the movements in the lungs to any marked degree.

A recent check up in the more up to date, modern equipped sanatoriums showed from seventy to eighty per cent of their cases to be under some form of collapse therapy. These figures, of course, include pneumothorax. The percentage of surgical collapse cases should run from twenty to thirty per cent phrenicectomies, five to ten per cent thoracoplasties and five to ten per cent other surgical procedures or combinations of the above. We now do not wait for a case to become so far advanced that nature sets up her own collapse measure in the faint hope that this will result in a cure. We have now at our command the following surgical collapse measures and combinations of each that will early bring about a condition of collapse and rest to the affected part, the lungs.

These operations all attempt to bring about rest and may be divided into four main groups, nerves, muscles, ribs and lungs. The amount, type and degree of disease present determines which of the above will be first used.

Nerves

Phrenic

Temporary

Permanent

Intercostal

Temporary

Permanent

Muscles

Scalenectomy

Plombage

Paraffin

Pectoral muscle

Fat

Bag

Ribs Thoracoplasty

Complete 1 to 11 inclusive Antero-lateral

Partial First rib, Phrenic, Scalene,
same incision

Costectomy

Lungs

Pneumolysis

Open

Closed

Drainage of cavities

Lobectomy

General Indications—Practically every demonstrable unilateral tuberculous lesion should have some form of surgical collapse therapy and few should be left to bed rest alone. In emergencies such as severe hemorrhage, massive or repeated, it has a place. Any case that fails to show response to a reasonable period of expectant treatment should be considered for collapse. Certain types of chronic unprogressive fibroid cases, with large cavitation, may recover a fair degree of working capacity and comfort after collapse therapy. Tuberculous enteritis, laryngitis, are not contra-indications. If the primary focus can be cleared up, the above will take care of themselves.

Advantages—The advantages are self apparent. It reduces the toxemia, shortens from fifty to seventy-five per cent the period of treatment, brings about a greater degree of working capacity in a shorter time and brings about a cure more permanent and lasting than can be anticipated under other measures because upon return to society and activity the lung does not resume its full function. It converts the positive into a negative case.

If we could close our eyes a little and visualize an Utopia in which all the positive cases were placed behind as formidable a wall as the great wall of China it would only be a few years until tuberculosis, like small pox, would be talked of in the past and one would only see a few sporadic cases.

The surgeon who thinks that by merely unroofing a few centimeters of ribs over a tuberculous lung or by paralyzing a

diaphragm for six weeks he has met the demands imposed upon him by the patient, is far from the truth. The thoracic surgeon is never satisfied, and the case is not complete surgically, until the sputum has become negative. This is the goal and we must keep on until this end is reached even though we start with the least surgical procedure and have to carry on to the more formidable operations, then will we meet the demands put upon us by our patients and society.

Tuberculosis is a disease that kills. It is rare for a patient to cure his tuberculosis by himself, alone. Our high death rate in tuberculosis is proof enough of this fact. If we keep one jump ahead of the tuberculosis, we will cure our patient—one jump behind the tuberculosis, we will kill our patient. The collapse procedure that is indicated at the time of first seeing the patient, is the one that will bring about a steady, increasing diminution of the diseased process.

In one case, we would expect a phrenic to close a cavity, in another, obviously, we would not wait for a phrenic, but start a thoracoplasty immediately.

Indications for Phrenicectomy—A phrenicectomy is indicated in any case in which a pneumothorax is indicated. Obviously, the reverse is not true, we would hesitate in putting a lung down for three years for a progressive lesion the size of a centimeter when a temporary paralysis of the diaphragm with its accompanying rest and compression of the lung might have brought the disease to a favorable termination. By its telescoping action, it may relax sufficiently to collapse cavities with the continuation of pneumothorax. Fifty per cent of the cases which have not reacted to pneumothorax by closure of the cavities, will be closed on the institution of phrenicectomy as an additional measure. The rise of the diaphragm relaxes the apex as much as the base, and it is indicated in upper lobe cavities as well as middle or lower ones, although the results obtained in lower lobe cavities are not as satisfactory due to the mechanics of internal drainage.

Phrenicectomy is indicated in moth-eaten cavities and grape skin cavities. One can expect absolute collapse in over fifty per cent, and definite improvement in thirty-five per cent of this type of case.

Just before a collapsed lung is allowed to expand after a long course of pneumothorax treatment a phrenic paralysis is an insurance policy against reactivation in this lung. The phrenicectomy will decrease the size of the hemithorax to accommodate for the long collapsed lung, and lessen the dangers of tearing open a moderately fibrosing cavity. Approximately eighty per cent of the cavities closed by pneumothorax and the lung allowed to reexpand will break open again upon resuming normal activity within three years.

Indications for Thoracoplasty — This operation is indicated in the chronic, essentially unilateral fibrosing tuberculosis with a rigid mediastinum, the unilateral large open peripheral cavities, pyopneumothorax, cavitation not closed by other means. In acute, rapidly progressing unilateral disease, thoracoplasty may constitute the patient's only chance.

The modern operation of thoracoplasty resects not only the rib close to the transverse process, but should include from one to one and one-half centimeters of the transverse process itself. The rib should be removed by the posterior incision within a centimeter of the costo-chondral junction of the first to the fourth rib inclusive. As a large percentage of cavities are posterior this gives one the greatest collapse possible in the region where it is most needed.

The mortality statistics in thoracoplasty range from five to fifteen per cent depending entirely upon the operator. The surgeon who picks his cases carefully will have a mortality of only five per cent or so, but he will just as surely put as many patients in their graves with pulmonary tuberculosis as the operator whose mortality is fifteen per cent and who takes on a few more four-plus risks, and returns fifty per cent of these cases

back to their homes and society. To attempt these high risks one must have at his command a thoroughly trained operative team and post operative care and have a definite understanding of the normal physiology of the chest coupled with a deep understanding of the pathological conditions encountered and the operative pitfalls that may become manifested at any time. The thoracic surgeon of today should be as conversant with the stethoscope as he is with the scapel.

Indications for Pneumolysis — By partial thoracoplasty is meant the resection of ribs overlying the diseased lung, and resections of three, five and seven ribs may be removed leaving the remainder of a clear lung to carry on with. In this type of operation the diaphragm is rarely paralyzed. In the last few years we have heard a great deal about selective pneumothorax. A partial thoracoplasty is analogous to a selective thoracoplasty.

In the last few years a few bilateral selective thoracoplasties have been done with satisfactory results.

Indications for Plombage — The operation of plombage is indicated in moderate sized cavities with very little peripheral involvement. Bilateral apical cavitation is especially amenable to this procedure if the remainder of the lung fields are fairly normal. The idea of the operation is direct extra pleural compression of a cavity by means of fat, muscle, paraffin, rubber bag, or gauze pack with the rib acting as counter pressure.

Results of Collapse Therapy — With a widespread application of compression therapy to the early suitable case, the number of permanently closed cases should be higher than fifty per cent. In a well regulated sanatorium, where the cases are sent in at an early stage, seventy-five per cent should be under collapse therapy. This will not be true in the old boarding house type of sanatorium.

Tuberculosis is a self-limited disease — by death. Sixty per cent of all open progressive tuberculous cases under sanatorium care proceed to a fatal termination.

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Tuberculin Survey of Webster County School Children

IN THE spring of 1934 the County Health Department of Webster County, Missouri, at that time

headed by Dr J W Bailey, County Physician and Miss Elnoire Hackmann, County Health Nurse, advised with us relative to making a tuberculin survey of all the school children in Webster County. She had the backing of the Parent Teachers Association as well as the good will of practically every citizen in the county. The following offer was made and accepted by the various organizations of the county:

All school children were to receive 1/10 milligram of Old Tuberculin, to be administered by some member of the staff of the Missouri State Sanatorium and 48 hours later was to be read. All positive reactors were to be x-rayed at the institution with a minimal fee of \$1.00. However, before giving any child the test a written consent by the parents was required, this in order to prevent any unpleasant publicity.

The following table gives in a brief manner the immediate results of the test:

	Total	Percent
Number school children in county	4042	
Number tested	3109	
Positive reactors	451	14.5% of positive reactors
Number of x-rays	363	80.5% of number x-rayed
Number active adults judged from x-ray and sedimentation	9	
Number active or semi-active judged from x-ray and sedimentation recommended for check up	111	30.58%
Number active adults judged from x-ray and sedimentation recommended for sanatorium treatment or home rest	14	0.84%

I might add at this time that it took the better part of 18 months to make and read the tests and transport these children approximately 60 miles to the institution and get x-rays.

The first thing of interest in regard to the above figures is the whole-hearted co-operation of most of the people. By far the majority of the parents of this

county were not only willing but anxious to have their children tested. In many instances people

brought young children not of school age and even asked for the skin test for themselves. By far the greatest number of refusals came from the uneducated group and in many instances the very people about whom information was most needed.

The next point of interest is the low percentage of positive reactors, which is most likely explained by the fact that this is a rural county and has no town with a population of over 1500. There were 20% of the positive reactors who did not have x-rays. This is probably explained by the fact that we were unable to x-ray all reactors within the first month or two after the skin tests were made. Others had either moved from the county or had changed their mind. It is interesting to note that of the 363 x-rays there were 9 cases of adult pulmonary tuberculosis and only one of whom suspected he had the disease. This means that we discovered 9 active cases who were spreading germs about the community and upon the most potent soil possible, the school children of this 9, at least one was a school teacher who was then teaching in her school for the second term. The percentage of reactors in this school were 66% against an average of 14%. In another school where it was known the teacher had died of pulmonary tuberculosis after having taught two terms, the percentage of positive reactors was also over 60%. There were 14 or 0.84% of this group which was x-rayed who suffered from active primary or childhood tuberculosis as judged from x-ray and sedimentation rate and were recommended for sanatorium or home rest. There were 111 who had either active or semi-active disease

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as judged from x-ray and sedimentation but whose conditions were such that it was not felt necessary to place them on strict bed rest. These cases were recommended to have check ups in from three to twelve months.

Had the information obtained from this survey been put to no other use I am sure the survey would have been well worth while. More information in regard to tuberculosis was probably disseminated in this county during the 18 months of this study than ever before. The people of the county became tuberculosis conscious. The members of the county court who make out the county budget and through whom all expenditures are made have since this time better understood its problems and responsibilities relative to this disease. However, this was not the end. The county health nurse used this information to good advantage and is still keeping in contact with the families who presented children with positive reactions.

As stated above, this tuberculin survey began in the spring of 1934, starting April 1. Records of discovered cases of tuberculosis had been kept in the county since August 1, 1931, and between August 1, 1931 and April 1, 1934, there were 23 cases which had come to the attention of the health department. Practically all of these cases were in the advanced stages and very little, if anything, could be done for them. After April 1, 1934, there were 42 active cases discovered as a direct result of the tuberculin survey. In addition to this there were 24 other cases discovered as an indirect result of the tuberculin test, practically all of whom, the health nurse assures me, would not have been discovered had it not been for this survey. This survey made it easy for the nurse to discuss health problems with the family and in this way found many additional cases of old tuberculous contact which would have been found in no other way. To quote from Miss Hackmann, the county nurse: "I find heretofore families have tried to cover or hide their tuberculosis contacts,

but they are now more open and free to discuss their tuberculous family relations." In answer to a question relative to the value of these tests to her county, Miss Hackmann stated, "No chest clinic in Webster County would have been of as great a value in a case finding survey in my opinion, as tuberculin testing of school children has been."

I do not know the exact figures in dollars and cents, but do know that the entire cost of this survey was not over \$500.00. It is difficult to estimate the value of human lives in dollars and cents and I am not much of a statistician, however, it might be well to think of what it would mean to leave 66 people in a county suffering from adult pulmonary tuberculosis to spread this disease. Certainly from the dollar and cent standpoint it is not a paying proposition to permit these cases to go undiscovered, especially when there are preventable measures at our command.

This problem of eradicating or controlling pulmonary tuberculosis has been a subject of vital interest for the past 50 years. During this time, we have seen a very rapid decrease in the death rate. No doubt a large percent of this decrease is due to the intense educational program of the National Tuberculosis Association and other health agencies. This educational program has been extended, not only to the medical profession, but to the laity and the people at large. Millions of dollars have been spent and no doubt not in vain, however, in spite of all of this wonderful work, tuberculosis still ranks first in the cause of death between the ages of 15 and 45. In spite of the campaign for early diagnosis, 5 out of every 6 patients admitted to the sanatoria in this country are in the advanced stages. There are several reasons for this, the foremost of which are:

1. The patient seldom presents himself to the physician until he is in the advanced stage. In fact the symptoms are often so slight that they may go unnoticed for many days. Even loss of

(Continued to page 36)

Prognosis in Arrested Tuberculosis*

IT HAS been stated by some students of tuberculosis that the most certain thing about the prognosis of this disease is its uncertainty. Those who have had considerable clinical contact with tuberculous individuals will on the whole subscribe to this viewpoint. Despite this skepticism there are certain tangible facts about tuberculosis that justify one to assume the role of a prognosticator and to predict the end result in a certain patient. Who can deny the clinical fact that a minimal case of tuberculosis has a better chance for recovery than a far advanced one? On the other hand, who can challenge the veracity of the statement that milary tuberculosis and tuberculosis meningitis are fatal diseases?

In the past decade newer methods of treatment have been sufficiently tried out to enable one to estimate with a certain degree of accuracy their influence on prognosis. The statistical facts to be presented permit one to evaluate the influences of only two older methods of treatment on prognosis, namely, bedrest and pneumothorax treatment.

The writer has for some time been engaged in making follow-up studies on discharged arrested patients from Koch Hospital, the municipal sanatorium for the treatment of tuberculosis. The follow-up work was carried out through the Municipal Visiting Nurses by obtaining the necessary data directly from the patient and by tabulating same on a questionnaire prepared for this purpose. This information was not difficult to obtain since many of our discharged patients are still under clinic supervision. In some instances no information could be obtained since the patients were either lost or had left the city. The Bureau of Vital Statistics was consulted for the purpose of discovering whether any of the lost patients were dead, or whether they were re-reported as

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active by private physicians

This paper is based on an analysis of the end re-

sults in 398 arrested or apparently healed cases of tuberculosis discharged from Koch Hospital during the years 1923 to 1934—a period of 11 years.

For the sake of clarity the writer desires first to define the term "arrested" disease. The American Sanatorium Association originally adopted a classification in 1909 but since then modifications have been made several times. The most recent pamphlet issued by the National Tuberculosis Association in January 1931, defines arrested disease as follows: All constitutional symptoms absent, sputum, if any, microscopically negative for tubercle bacilli, x-ray findings compatible with a stationary or retrogressive lesion. These conditions shall have existed for a period of six months, during the last two of which the patient has been taking one hour walking exercise twice daily or its equivalent. This definition applies to pulmonary tuberculosis only. The term apparently cured applies to the childhood and bone cases.

All patients discharged as "arrested" from Koch Hospital met the requirements as outlined at that particular time by the National Tuberculosis Association.

The 398 cases followed up consisted of 212 males and 186 females, of these 398 patients, 52 were negroes, 23 of whom were males and 29 females. Although the ages varied from 1 to 74 years, 56% were in the age groups between 15 and 35.

The results of the follow-up study can best be shown in the following tables.

Table 1
Classification of 398 Patients as to color, type and stage of disease

	White	Negro	Both	% of Total
Pulmonary				
Minimal	48	9	57	14.3%
Mod. Adv.	111	13	124	31%
Far Adv.	102	13	115	44%
	321	35	356	89.3%
Juvenile or Childhood	8	10	18	4.5%
Extra Pulmonary	17	7	24	6.2%
GRAND TOTAL	346	52	398	100%
	(87%)	(13%)		

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Table 2

End results in 398 arrested or apparently healed cases of tuberculosis discharged from Koch Hospital (white & negro) years 1923-1933

Year	No Discharged	No Traced	%	Remained Well	%	Relapsed	%	Died	%
1923	4	3	75	1	33			2	66.66
1924	14	5	37	9	60	1	40		
1925	22	8	36	4	50	1	12.5	3	37.5
1926	30	10	33.33	3	30				
1927	30	16	40	6	37.5	5	31.2	5	31.2
1928	21	11	52	5	45	3	27.5	3	27.5
1929	40	27	67.5	12	44	10	37	19	19
1930	23	15	65	9	60	4	26.5	13.5	13.5
1931	34	32	94	20	90		10		
1932	65	60	92	54	90	5	8	1	1.5
1933	106	102	96	93	91	6	6	3	3
Total	398	289	72.6	219	76	59	16	31	11

Table 3

End results in 398 cases according to stage and type of disease

	No	Traced	Well	%	Working (School)	%	Relapse	%	Died	%
Minimal	57	28	25	89	20	80	2	7	1	4
Mod Adv	124	69	49	71	27	55	11	16	9	13
Far Adv	175	160	117	73	59	50	25	18	18	11
Extra Pulmonary	24	14	10	71	3	20	1	8	3	21
Juvenile or Childhood	18	18	18	100	14	77				
Total	398	289	219	76	123	56	39	13	31	11

Table 4

INFLUENCE OF PNEUMOTHORAX ON PROGNOSIS

Number of Patients discharged during 1931-1932 and 1933-1934

	No Remained Well	%	Relapse	%	Died	%
Number with Pneumothorax	57	63	93	4	7	0
Number without	137	123	90	10	7	4

Table 5

Follow up of 52 arrested negro patients

Year	Total Discharged	Traced	Remained Well	Work or School	Relapse	Dead
1925	1 hip case	1			1	
1926	4					
1927	3	3			1	1
1928	1					
1929	0				1	
1930	0					
1931	0					
1932	0				1	
1933	21	10	10	13		
Total	52	20	34-57	20-50	4-11	1-2

Table 6

Comparative end results white and negro cases

	Total No Discharged	Traced	%	Well	%	Working or School	%	Relapse	%	Dead	%
White	346	250	73	185	73	103	55	35	14	30	13
Negro	52	29	55	34	65	20	39	4	11	1	2
Total	398	289	72.6	219	76	123	56	39	13	31	11

Discussion

A more detailed study of the foregoing figures reveals many interesting facts deserving comment. It will be noticed that approximately 76% of the cases discharged from Koch Hospital as arrested have remained well, 13% relapsed and that only 11% died. In attempting to evaluate and compare these results with those obtained from other sanatoria, the writer was amazed to find that, despite the voluminous literature which exists on almost any phase of experimental and clinical tuberculosis, only very meager information is available in regard to follow-up studies on discharged sanatorium tuberculous patients and that practically no information could be obtained in regard to end results in discharged arrested cases. The studies made by Dublin¹ in 1929, Whitney and Myers² in 1930 are not in the same category with this study since the former included all types of discharged cases in their investigations, such as unimproved, improved, quiescent and a small number of arrested cases, while this study concerns itself with arrested cases only. Furthermore their objective was to determine the per cent of living patients at the end of a certain period, while our objective was to find the per cent of well patients at the end of a certain period.

A pamphlet issued in January, 1933 by the National Tuberculosis Association entitled, "What Happens to Patients Discharged From Tuberculosis Sanatoria" and written by William F. Lawrence³ of the Statistical Department, is of some comparative interest. Lawrence reports a follow-up study by questionnaire of 238 discharged cases from Massachusetts sanatoria during 1928. In his group he includes all types of cases of which 32 were arrested. He found that at the end of three years 32% of all his cases were dead, 19% of the arrested cases had relapsed, and that 3% of the arrested cases were dead.

A further analysis of the statistical data as revealed in table two indicates a general way that the per cent of

who have recovered is inversely proportional to the lapse of time since discharge from the institution, or, in other words, the per cent of those who have relapsed or died is directly proportional to the lapse of time since discharge from the institution

That early diagnosis is the keystone to successful treatment and ultimate recovery from the disease, follows from the fact that of the minimal group 89% remained well and of these, 80% were working as compared with 73% and 50% respectively of the advanced group. It is of interest to mention in this connection that the average residence in the sanatorium of the minimal, moderately advanced and far advanced cases before obtaining an arrestment of their disease was 528, 554 and 929 days respectively.

As to the effect of pneumothorax on prognosis, the figures are self-explanatory. All pneumothorax cases with the exception of one, were discharged in the past three years, and during the same three years, 137 were discharged without having received pneumothorax treatments. When we bear in mind the fact that the cases which were given pneumothorax treatments were mostly those who did not respond to bedrest treatment and were of the far advanced group (49 out of 57), the favorable influence of pneumothorax on prognosis can best be appreciated.

An interesting group to study is the discharged negro patients. For a long time it has been the belief of many students of the problem that negroes offer no resistance to the disease and that the lesion in the negro is generally a progressive one leading to a fatal end. Contrary to our expectations, the results in the negro group were almost incredible and caused us to revisit the negro patients and to recheck our statistics thereby confirming the original surprising but pleasant findings. The results obtained in the 52 negroes are most encouraging and challenge the former theories. These follow-up studies indicate that given the benefit of early diag-

nosis and proper treatment the negro can respond to treatment and can recover from this disease.

Conclusions

In conclusion the writer wishes to point out that there are 5 definite facts which stand out as a result of this study.

1 Bedrest is an effective method of treatment since 74% of those who remained well received this form of treatment only.

2 Collapse therapy, and specifically pneumothorax therapy, favorably influences the prognosis in pulmonary tuberculosis.

3 The chance for life of the tuberculous patient is directly dependent upon the stage at which the disease is discovered. Patients with minimal disease get well sooner and live longer than those with far advanced disease.

4 Most children with childhood tuberculosis recover from their disease.

5th and last Negroes, when given the benefit of early diagnosis and proper treatment, can recover from tuberculosis.

It is gratifying to find that many of the patients who have fought the tedious and prolonged battle with this old enemy of society have recovered and have continued to remain well. In as much as TIME is the best indicator of the effectiveness of any method of treatment the only positive evidence of the efficiency of any treatment is the living patient, clinically well, socially free, and economically self-reliant.

BIBLIOGRAPHY

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3 Lawrence, William F. What happens to patients discharged from tuberculosis sanatoria. Issued by National Tuberculosis Association (January) 1933.

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(A National Association of Private Sanatoria and Chest Specialists)

COTTON AVENUE AND WYOMING STREET
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May 1, 1936

Gentlemen

This is the fifth in a series of open letters addressed to physicians and welfare organizations. If you did not receive the previous issues, we will be pleased to furnish you with copies upon request.

The Metropolitan Life Insurance Company maintains a sanatorium at Mount McGregor, New York, for the private care of their tuberculous employees. Other organizations have entered into agreements with existing private sanatoria to provide sanatorium care for their tuberculous members.

The sanatoria listed below are the finest private sanatoria in the United States and are equipped to administer the best of medical care and treatment. Permit us to acquaint you with the facilities now available in these institutions for the care of your employees or your members who are afflicted with tuberculosis.

For further details please address the Committee on Economics of the Federation of American Sanatoria at the above address.

Sincerely yours

COMMITTEE ON ECONOMICS
Federation of American Sanatoria

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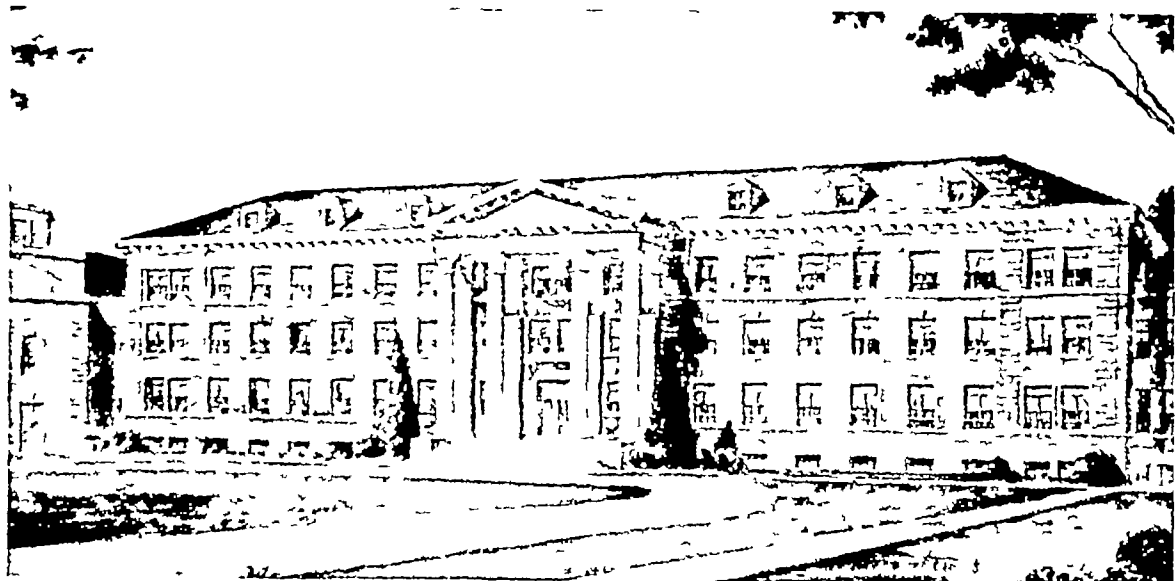
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Missouri State Sanatorium

Mount Vernon, Missouri

The above picture is that of the new Medical Center at the Missouri State Sanatorium which will be completed in the early part of 1937. The institution is located at Mount Vernon and was opened August 17, 1907, with a capacity for twenty-four tuberculous patients. Today the Missouri State Sanatorium has ten major buildings for patients with a capacity of 505 beds, including a fifty bed preventorium for children and twenty-four beds for colored patients. Prior to 1925 the institution had been conducted more or less on the scale of a rest camp, the construction of the sanatorium having been patterned similar to the Saranac Cottage plan, but today every known and proven advanced method of treatment is available for those patients admitted. More than 10,000 patients have been treated in the institution since its establishment. Dr. W. J. Bryan is the superintendent and medical director and is assisted by six resident physicians, a steward, thirteen graduate nurses, fifty practical nurses and orderlies, a dietician, an x-ray technician and a full time laboratory technician. The daily per capita cost during 1935 amounted to \$1.64. In addition to the splendid work of the sanatorium, an out-patient department is maintained and members of the staff frequently cooperate with school boards throughout the surrounding communities by conducting health clinics and by giving school children the tuberculin test. Plans are under way for the erection of a new infirmary ward which will have a modern medical and surgical unit built in connection.

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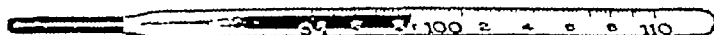
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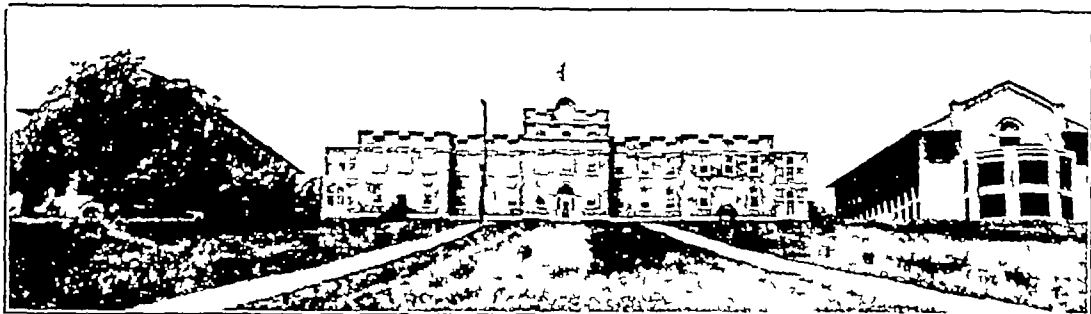
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Looking toward the main building, with the Women's Building (left) and the Men's Building (right)

Robert Koch Hospital

BY

G. D. KETTELKAMP, M.D.

Superintendent

Robert Koch Hospital, an institution owned and operated by the City of St. Louis for the care of its citizens afflicted with tuberculosis, is located on the west bank of the Mississippi River about two miles south of Jefferson Barracks, and about fifteen miles south of the business section of St. Louis. It is on one of the main lines of the Missouri Pacific Railroad. The postoffice is known as Koch, Missouri. The location is one unusually well adapted to the treatment of tuberculosis. Away from the disadvantages of the large city it is at the same time near enough so that by means of the excellent all-weather roads the city's advantages are sufficiently easy of access. The scenery centered about the old Mississippi is very inspiring and conducive to a life of thoughtful relaxation, an advantage inestimably valuable to one who must lay aside life's worries and hustle and bustle for an extended period in his quest of health.

The history of the institution is very interesting. However, space will permit only a very brief historical sketch. Anyone interested in more detail is referred to the June, 1935, number of the "Koch Messenger" published by the patients of Koch Hospital.

In June 1854, the City of St. Louis purchased 64 acres of the present 169 acres, and established a quarantine station for infectious diseases. In those days, yellow fever, cholera, and smallpox were terrible scourges, and many unfortunate victims of these diseases lost their lives at the Quarantine Station in those early days. Since practically the only communication into and out of the city of St. Louis was by river traffic and trails, most people entering the city came by boats from New Orleans and the South. These boats could

be stopped here and the crew and passengers quarantined long enough to determine whether or not these infectious diseases were aboard. Some lepers were also quarantined here.

By 1910 sanitary measures against contaminated food and water supplies in case of cholera, proper screening of the mosquito in case of yellow fever, and vaccination in case of smallpox, had almost eliminated these diseases, but the need for the isolation of tuberculosis patients had by that time become very evident. Consequently, in that year the first patients with tuberculosis were isolated here and the name changed to Robert Koch Hospital, in honor of the eminent Dr. Robert Koch of Germany. However, in these early years Koch Hospital served primarily as a place of isolation, and not much was expected in the way of treatment for tuberculosis. In 1922 a bond issue was voted by the City of St. Louis to add several necessary buildings, and along with the propaganda which resulted in the bond issue, came also the development in the institution and better regulations and regime for the treatment of tuberculosis.



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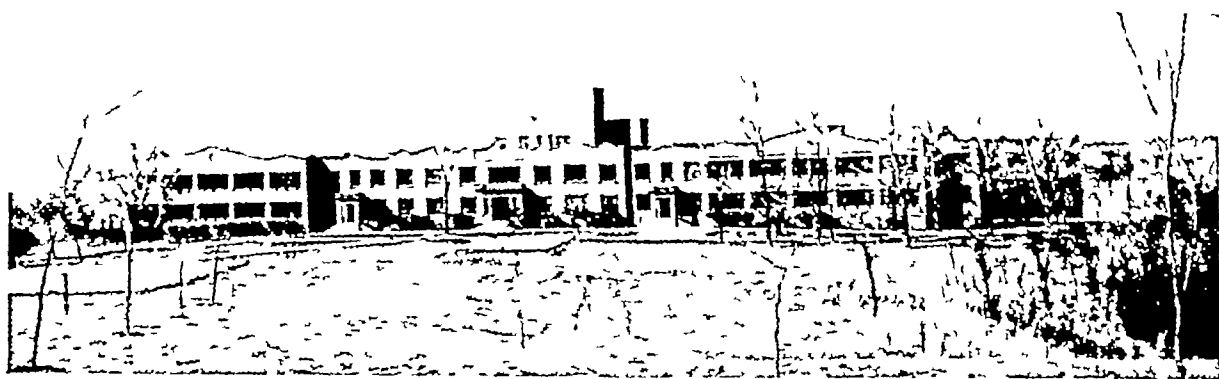
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Kansas City Municipal Hospital

BY
MISS MERLE WALKER, R N
Superintendent

In 1906, the City Council of Kansas City, Missouri, first realized the need of special care for tuberculous patients, and effected plans for organized treatment of the disease.

In 1908, the Jackson County Society for relief, prevention and control of tuberculosis was formed. Mr Frank P Walsh, prominent lawyer of Kansas City and Washington, was first president. In 1909, through his efforts, the National Tuberculosis Association Exhibit was brought to Kansas City. Forty-five thousand people attended, which brought to the attention of the authorities the fact that people felt the need of the proposed institution and it gave them courage to proceed and submit the bond issue for the first building.

The building was begun in 1914 and was built by the prisoners of the Municipal Farm thus cutting the cost of construction to a minimum. The erection of the building was slow owing to the fact that so much of the labor, although properly supervised, was that of unskilled men. The winding road leading from the highway below was cut from the cliffs by axes, picks and shovels.

The institution is located on a fifteen acre tract of ground—a part of the Municipal Farm—about seven miles from the downtown district of Kansas City. The buildings are situated on the top of a hill, which rises two hundred feet above the U S Highway No 40. The grounds surrounding the buildings are of varied character, lending charm and diversity to the general landscape. Kansas City presents a beautiful picture viewed from the hospital.

On Christmas day, 1915, the building was opened with eighteen patients as inmates. The furnishing of the building took place as rapidly as possible. The first ward opened in what is now called East 1, which is the first floor of the east wing and was for the men patients only. The next ward was what is now called West 1, this ward took care of the women patients.

Kansas City has been most fortunate in always having as Members of its Health Department, men and women deeply interested in the study and care of tuberculosis, notable among whom was Dr E W Schauffler, one of Kansas City's oldest and best loved physicians. He was one of the group who started the first tuberculosis campaign in 1908 and remained active in the work until his death on October 29, 1916. There were also Mr Tom Flinn, at one time president of the board of health, Dr W L Gist, formerly superintendent of the Kansas City Municipal General Hospital, Dr Paul Papuin, who at one

time operated the Asheville-Biltmore Tuberculosis Hospital at Asheville, North Carolina. It was through the enthusiasm of Dr Papuin that Dr Gist became interested and was able to do so much for the situation in Kansas City. Dr Kerwin Kinard, Dr Frank Hurwitz, Dr Sam Snider, Dr Herbert Mantz, Dr George Lee and Dr W A German, have all been Medical Directors of the sanatorium at Leeds.

In 1925 a bond issue was voted in Kansas City, out of which \$150,000 was available for the tuberculosis hospital, and in 1929 a new building was erected for negroes, thus increasing the capacity of the beds to 161.

The Kansas City Municipal Tuberculosis Hospital is financed and maintained by the tax payers of Kansas City, Missouri, and only residents of Kansas City are eligible as patients.

Dr Edwin Henry Schorer, Director of Health for Kansas City, Missouri, is deeply interested in tuberculosis work, and has been untiring in his efforts to make this sanatorium the best in the country.

The Kansas City Municipal Tuberculosis Hospital is fortunate in having the entire staff of the Kansas City Municipal General Hospital as consultants. They are all outstanding men in the Medical Profession and Members of the Jackson County Medical Society, who give gladly and unstintingly of their time and skill to this cause.

Dr W W Buckingham, who is serving as Medical Director of the sanatorium, graduated from the University of Pennsylvania, interned at St Luke's hospital in Kansas City and then returned to Philadelphia for one year of post graduate work in surgery. He then went as instructor in Thoracic Surgery to the University of Michigan Hospital and Medical School, where he received his training in tuberculosis, stressing particularly surgical collapse measures.

In 1934-35 approximately \$180,000 was issued under the ten year plan for the Kansas City Municipal Tuberculosis Hospital.

With the money available a surgical pavilion was built, considerable reconstruction was done, and many improvements of different departments were made and the whole hospital was equipped with the most modern devices and furniture, thus increasing the capacity from 168 beds to 260.

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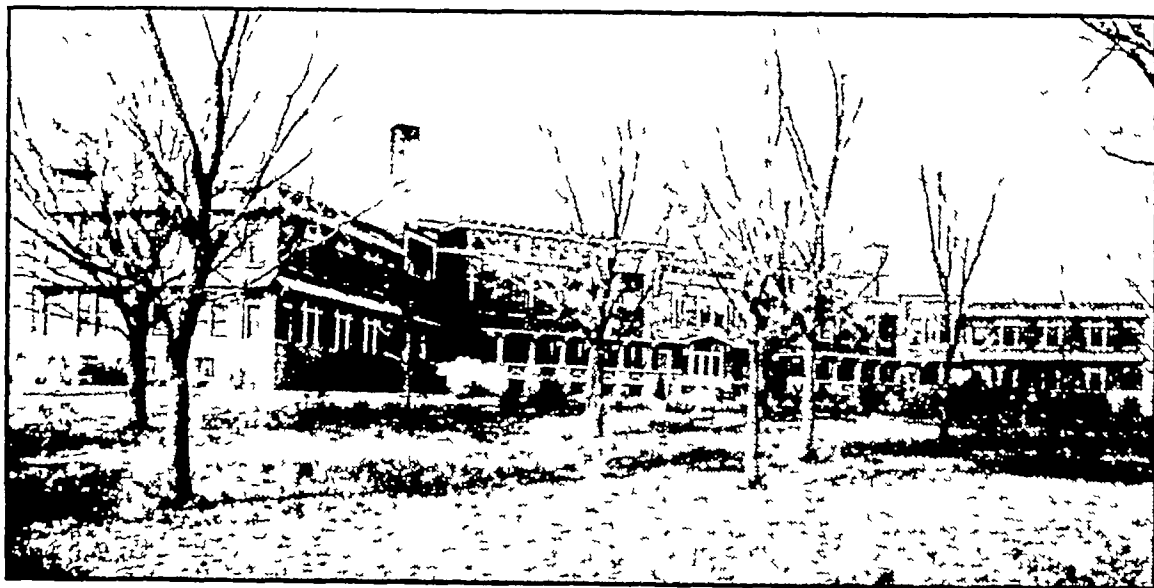
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Jasper County Tuberculosis Hospital *Webb City, Missouri*

BY

JESSE E. DOUGLASS, M.D.
Superintendent

The Missouri State Legislature in 1915 enacted a Law entitled "Tuberculosis Hospital Bonds, Establishment of Tuberculosis Hospitals", whereby any county could issue bonds for the erection of a tuberculosis hospital and further stipulated that the State of Missouri would furnish financial aid towards its maintenance by paying to the County Court \$5.00 per week for each county patient. The direction and management of these hospitals was to be vested in a Board of Tuberculosis Hospital Commissioners of five members to be appointed by the County Court.

Pursuant of this enactment, the Jasper County Court, following a proper vote of the residents of the county, issued bonds for \$100,000 to erect the Jasper County Tuberculosis Hospital. This hospital is built of brick, stone and concrete construction to accommodate one hundred patients. It is located one and a half miles northwest of Webb City on a forty-acre tract of land which was donated by Mr. James A. Daugherty to the Jasper County Court.

The State Legislature in 1925 amended the original law and provided for an increase in State Aid funds from \$5.00 per week to \$12.50 per week for each indigent patient and further provided that any county in the State of Missouri could maintain patients in the Jasper County Tuberculosis Hospital. At the present time the Hospital Bonds have been paid and there is no outstanding indebtedness against the Hospital except the current monthly bills.

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THE USE OF THE TUBERCULIN TEST IN PRIVATE PRACTICE

(Continued from page 13)

detect active cases among their adult contacts

Active pulmonary disease rarely appears before puberty. Children infected before or during puberty are very liable to develop active disease during teen ages, so should be watched carefully. Tubercu-

culin tests show us the ones to watch

Tuberculin tests in adult groups save x-ray films and allow attention to be focused on patients who are known to harbor tubercle bacilli. Routine films made of these patients will reveal many cases of active disease before symptoms develop

COMPLICATIONS IN PULMONARY TUBERCULOSIS

(Continued from page 10)

disposing factor that has weakened the bronchial walls resulting in bronchiectasis. Pulmonary tuberculosis is often associated with this disease

Recent investigations have shown that atelectasis of an entire lobe or part of a lobe of the lung rather frequently results from pulmonary tuberculosis. The displacement of the mediastinum usually gives the clue to the diagnosis

Fistulae in and around are frequently associated with pulmonary tuberculosis. Our investigations have shown that often with an acute flare up of a chronic fistula there is an associated exacerbation of the lung condition. Some authors think that a chronic fistulous tract acts as an immunizer which holds in abeyance the lung condition. They think that explains why lung conditions sometimes progress more rapidly after the fistula has been healed by surgery. There is much room for debate on this point, however. One point I desire very much to leave with you is, *never treat a patient's fistula without examining his lungs thoroughly*

So called cold abscesses in the chest wall should always remind one of an associated pulmonary tuberculosis and we should never fail to look for it. Though the exact etiology of these abscesses may be debatable, this does not detract from their being an indicator of a possible pulmonary tuberculosis

Ulcerations of the buccal mucous membrane occur much less frequently than one would expect when one considers the great number of tubercle bacilli constantly passing over them. They are almost always secondary to a pulmonary tuberculosis and give an unfavorable

prognosis. Ultraviolet or x-ray therapy may be beneficial

Myocarditis, pericarditis, phlebitis, otitis, arylodosis and other complications could be discussed at length did time permit, but since it does not, a mere mention of these must suffice

Before closing, however, I wish to say a few words about haemoptysis which really should be considered a symptom rather than a complication. A hemorrhage from the lung may be caused by many things other than pulmonary tuberculosis but it is such a common symptom of this that one should never dismiss the possibility until he has proven another source of the haemoptysis or proven that tuberculosis is absent

Various drugs are recommended for haemoptysis, most of which are of doubtful value. Sedatives should be given to quiet the patient's anxiety but morphine must be used with great caution as its extreme depressing effect allows too much of an opportunity for tubercle bacillus laden sputum or blood to spread the disease to other parts of the lungs. When it can be accomplished, pneumothorax is our best weapon against hemorrhage. Phrenic paralysis or a partial or complete thoracoplasty may succeed if the patient's condition warrants these procedures

Permit me to close with this statement, that although there are valuable methods of treatment for many of the above mentioned conditions, the most important treatment for most of the complications of pulmonary tuberculosis is the treatment for the pulmonary tuberculosis itself

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SURGERY IN PULMONARY TUBERCULOSIS

(Continued from page 10)

within five years. A patient who, at the beginning of his sanatorium treatment, has a cavity the size of a cherry which does not show a tendency to heal has only a twenty per cent chance of being alive at the end of six years of sanatorium treatment.

A patient with a phrenicectomy has over a fifty per cent chance of a permanent cure, an eighty-five per cent chance of a cure or marked improvement. A patient with a thoracoplasty has a seventy-five to eighty per cent chance of a permanent cure. Forty to fifty per cent of the failures of pneumothorax due to adhesions, are suitable for severance by the cautery.

Conclusions

The idea of surgical treatment of pulmonary tuberculosis has been forced to justify itself in a more or less constant struggle against ultra-conservatism. To justify itself at all, the newer conception

of surgical collapse has been forced to prove itself almost exclusively upon the comparatively hopeless, far advanced case. It is only in the last few years that a few of the braver phthisiologists have given us their early hopeful cases to collapse, with gratifying results to all concerned. Nevertheless, in unusually far-advanced cases surgical collapse has consistently given evidence of better results than those achieved with expectant treatment in parallel cases.

In the future, with our fuller knowledge of technical considerations and deep understandings of pathology and physiology, and more thorough means of diagnosing the early case, we may look forward to an era in which the results will be uniformly more gratifying.

Early diagnosis plus early institution of collapse measures, equals early cure.

TUBERCULIN SURVEY OF WEBSTER COUNTY SCHOOL CHILDREN

(Continued from page 21)

weight, fatigue, cough and expectoration may be quite noticeable to friends before the patient complains.

2 The physician often does not suspect tuberculosis even when some rather self evident symptoms are present and even when he does suspect it, may not find physical signs sufficient to warrant a diagnosis without an x-ray, which, in many instances, can not be properly interpreted.

3 Even when the x-ray is advised, the patient cannot afford to have it taken and certainly the physician can not stand the expense. All of which brings us up against the problem of "how are we going to find these cases in the early stages?" Certainly we are not doing the job under the old methods. The answer is through our schools and school teachers.

This county having only one full time county health nurse and no full time

health officer, she had many other duties to perform and could not give all of her time to follow up work. I am sure if all of her time for the past two years had been given to following up this survey and visiting each and every home, instead of 66 new cases in two years, she would have easily doubled this number.

If, in turn, each county of our state would institute a yearly check up of their school children and follow up the positive reactors, it would not be long until our death rate would dwindle to almost nothing. It is true that such follow ups cost money but the reduction in the care of new cases would more than offset the money spent in finding them, and, not until the people wake up to the fact that tuberculosis is a preventable and controllable contagious disease when properly handled will this disease be eradicated.

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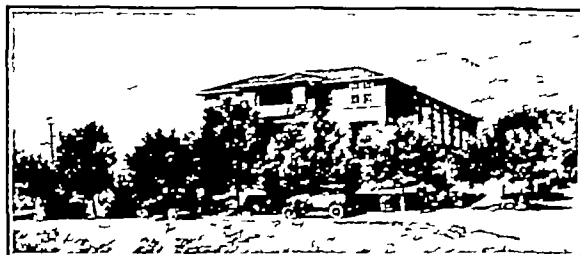
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PRIMARY CARCINOMA OF THE LUNG

(Continued from page 16)

time of the report Numerous other reports are given, but the frequency of recurrence of the growth is discouraging Total removal of a lung because of carcinoma of the bronchus was done first by Graham (2) April 5, 1933 In addition to removal of the lung and many mediastinal lymph glands, the 3rd to 9th ribs inclusive were removed This was a left lung Recent reports indicate the patient continues to do nicely Rienhoff (7) has given a report of the successful removal of the left lung for tumor in two cases His report also appeared in 1933.

Overholt (8) reports the successful removal of the right lung for carcinoma which is the first successful right pneumonectomy for cancer to be reported His operation was done November 13, 1933 Overholt (9) has recently reported a series of 8 pneumonectomies, six of which were for carcinoma of the lung Three of these survived the operation A follow up of the first patient operated found her to be in good health

It seems logical that the prognosis may be better after successful total pneumonectomy than it has proven to be in the cases of lobectomy which have been followed for a longer period of time In doing a lobectomy, it is not possible to so completely remove the regional lymph glands, and often the tumor mass extends up into the primary bronchus so that it cannot be completely removed Edwards (3) has been quoted in this regard and C I Allen (1) reports a case where lobectomy was performed and there was

a recurrence in the bronchial stub Radium was implanted and growth of the tumor has been arrested but the tumor persists The operation was performed in June, 1930 The report is made four years after the operation and clinically the patient is free from symptoms Allen's case demonstrates the value of combined radium and surgical treatment of carcinoma of the lung

Conclusions

1 More interest is being shown in the clinical features of carcinoma of the lung

2 The number of cases of cancer of the lung diagnosed has greatly increased

3 Carcinoma of the lung has often been confused with pulmonary tuberculosis and lung abscess, at times it is confused with other acute or chronic chest disease

4 There have recently been reports of successful treatment of carcinoma of the lung by surgery and radium

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- (5) Rabin, C B and Neuhof, H A Topographic Classification of Primary Cancer of the Lung Its Application to the Operative Indication and Treatment J Thorac Surg 4 147, Dec 1934
- (6) Tuttle W M and Womack, N A Bronchiogenic Carcinoma A Classification in Relation to Treatment and Prognosis J Thorac Surg 4 125 Dec 1934
- (7) Rienhoff, W F Jr Pneumonectomy Preliminary Report of Operative Technique in Two Successful cases Bull Johns Hopkins Hosp 53 300 1933
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- (9) Overholt R H Pneumonectomy for Malignant and Suppurative Disease of the Lung J Thorac Surg 5 54, Oct 1935

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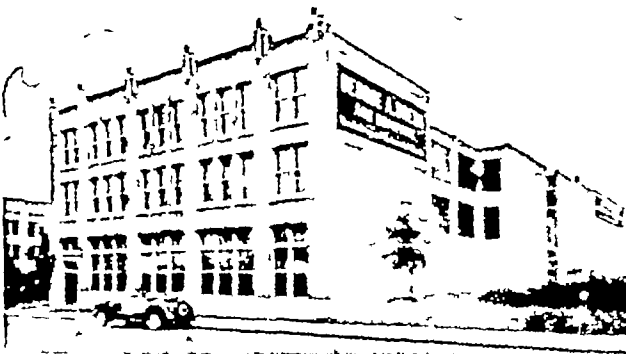
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Program

FOR THE MEETING OF THE

Federation of American Sanatoria

Convention Headquarters AMBASSADOR HOTEL, KANSAS CITY, MO

SUNDAY, May 10th

8 00 P M Executive Meeting, Ambassador Hotel

MONDAY, MAY 11th

10 00 A M Administrative Meeting

W W Buckingham, M D, Kansas City, Mo, Chairman Committee on Arrangements, Presiding

Message

William Devitt, M D, Allenwood, Pa., President, Federation of American Sanatoria
Committee Meetings

12 30 P M Luncheon Meeting, Ambassador Hotel

Max Rothschild, M D, San Francisco, Calif, Chairman, Presiding

Surgical Management of Pulmonary Tuberculosis-----

Edward J O'Brien, M D, Detroit, Mich
Paper will be discussed by E W Hayes M D, Monrovia Calif, Louis Mark, M D,
Columbus, Ohio W H Tharle, M D, Albuquerque, N M

2 30 P M Administrative Meeting

William Devitt, M D, Allenwood, Pa., President, Federation of American Sanatoria, Presiding

Reports of Committees

Election of Officers

TUESDAY, MAY 12th

12 30 P M Get-to-Gether Luncheon Meeting, Kansas Citian Hotel, Roof Garden

For the Members of the Federation and invited guests

LeRoy S Peters, M D, Albuquerque, N M, Chairman, Presiding

Orville E Egbert, M D, El Paso, Texas, Secretary

1 Chairman's Opening Remarks-----LeRoy S Peters, M D, Albuquerque, N M

2 The Value of Serial X Ray Following Broncho-Pneumonia-----

J Burns Amberson, Jr, M D, Bellevue Hospital, New York, N Y

3 The Management of the First Six Months of Pulmonary Tuberculosis

L J Moorman, M D, Oklahoma City, Okla

4 The Selection of Candidates for Thoracoplasty-----

F S Dolley, M D, Los Angeles, Calif

5 Closing Remarks-----Orville E Egbert, M D, El Paso, Texas

6 30 P M Banquet (Installation of Officers), Ambassador Hotel Roof Garden

Edward Holman Skinner, M D, Kansas City, Mo, Speaker of Evening

Chas O Giese, M D, Colorado Springs, Colorado Master of Ceremonies

WEDNESDAY, MAY 13th

2 00 P M Session on Tuberculosis, A M A Program, Section on Miscellaneous

Topics, Scientific Assembly, City Auditorium, 5th floor

James Alexander Miller, M D, New York, N Y, Chairman

Charles Hartwell Cocke, M D, Asheville, N C, Secretary

1 Chairman's Address Some Modern Concepts of Tuberculosis-----

James Alexander Miller, M D, New York, N Y

2 Pathogenesis of Tuberculosis-----Max Pinner, M D, Oneonta, N Y

3 Case Findings Methods for the Diagnosis of Tuberculosis-----

J Burns Amberson, Jr, Bellevue Hospital, New York, N Y

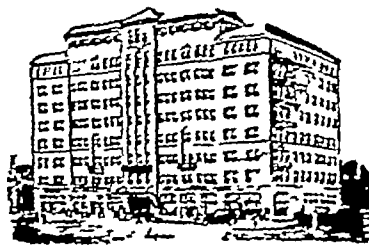
4 Sanatorium Care of the Tuberculous-----

LeRoy S Peters, M D, Albuquerque, N M

5 Compression Therapy, Uses and Limitations-----

J J Singer, M D, St Louis, Mo

Papers Number 2 3 and 5 will have lantern demonstration



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By Willam Detitt, M D, Allenuood, Pennsylvania

THE RESPONSIBILITY OF THE GENERAL PRACTITIONER IN THE TREATMENT AND PREVENTION OF TUBERCULOSIS

By F M Pottenger, M D Monrovia, California

THE DIAGNOSIS OF INCIPIENT PULMONARY TUBERCULOSIS

By John B Hawes, 2nd, M D, Boston, Massachusetts

CALCIUM THERAPY IN TUBERCULOSIS

By Benjamin Goldberg, M D, F A C P, Chicago, Illinois

PULMONARY MONILIASIS

By Jack C Norris M D, Atlanta, Georgia

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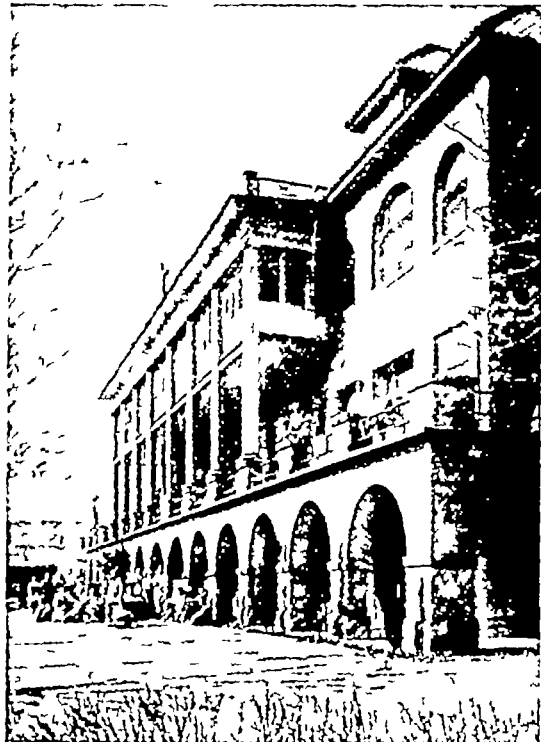
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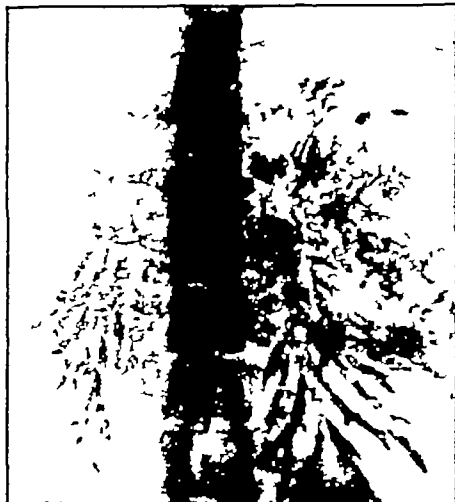
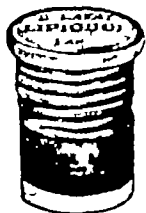
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(A National Association of Private Sanatoria and Chest Specialists)

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Gentlemen

This is the fourth in a series of open letters addressed to physicians and officials of industrial and welfare organizations. If you did not receive the previous issues, we will be pleased to furnish you with copies upon request.

Hospitalization in private sanatoria of the tuberculous members of fraternal and industrial organizations is not a new venture. Those patients who are members of an organization which makes such provision, are indeed fortunate, to be able to receive the best of medical and surgical care in time of need.

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Federation of American Sanatoria

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(A MONTHLY PUBLICATION)

"The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind"

Lawrason Brown, M D

Editorial Comment

Federation Meeting at Kansas City THE FEDERATION OF AMERICAN SANATORIA will hold its annual executive session at the Ambassador Hotel in Kansas City on Monday, May 11th, 1936. Dr. William Devitt of Devitt's Camp, Pennsylvania, the president of the Federation, will preside at the first session which will open at ten a. m., and at all other business sessions throughout the day. All members of the Federation should make a special effort to attend these business sessions, as the policies of the Federation and of DISEASES OF THE CHEST will be discussed at length. It is particularly urged that all members of standing committees be present.

At noon there will be a luncheon for members of the Federation at the Ambassador Hotel. Dr. Max Rothschild of San Francisco will preside, and he is arranging an excellent short program of a scientific nature. This program will be announced in the May issue of DISEASES OF THE CHEST.

The closing business session will be called at 2:30 p. m.

The Federation's annual banquet will be held in the same hotel the evening of May eleventh. This is always a high light of any meeting, and your committee on arrangements promises something extraordinary. All members of the Federation

their wives, and friends are invited to attend.

On Page 30 in this issue will be found the program of the other activities of the Federation. These activities offer each Federation member an opportunity to meet his old friends and to make new ones among the chest specialists of the country. Make your plans now to be in Kansas City May 11th to 15th.

R B H, JR

"Get-to-Gether" Luncheon YOU are invited to be the guest of the Federation of American Sanatoria at a round table luncheon at Hotel Kansas Citian on the second day of the American Medical Association Session, Tuesday, May 12th.

The feature of the luncheon will be a scientific program one hour in length, by three nationally known authorities on tuberculosis. The same standard of practical subject matter as has characterized the articles in Diseases of the Chest will prevail in this program.

There will be nothing to sell, no solicitation of pledges, memberships or subscriptions, in short there is no joker in the deck. You are to be the guest of men doing tuberculosis and institutions treating tuberculosis at no expense to you and without obligation on your part. If we can bring to you in resume form what is hap-

pening in research and management of tuberculosis and do it pleasantly and painlessly, we will be gratified

It would be a great service if you would register your acceptance with the Secretary, Dr R B Homan, Jr, First National Bank Building, El Paso, Texas. We expect to have several hundred guests and early reservations are desirable

Make your reservations now—

Then meet us at the Kansas Citian at noon Tuesday, May 12th. If you will do that I am sure our party will be a success for we are trying to send you home from that luncheon feeling that our program proved one of the high-lights of the A M A Meeting

LEROY S PETERS,
Chairman
ORVILLE E EGBERT,
Secretary

Session on Tuberculosis ELSEWHERE in this issue there will be found an announcement of the preliminary program for the Session on Tuberculosis at the coming Kansas City meeting of the American Medical Association, Wednesday afternoon, May 13th

The program has been addressed, as will be noted, to the topics of general interest related to tuberculosis, rather than to an effort to stimulate the interest of the men whose activities have long been in the field of tuberculosis, and whose interest therefore needs no stimulation. It has been deemed wise by the officers of this first session that this meeting should be devoted entirely to giving a rather broad background of the subject of tuberculosis, and it was with considerable regret that numerous excellent presentations on some of the more specialized subjects of interest in tuberculosis could not be included in the program. The limitation of the number of papers was also made by authority of the A M A, whose rules, of course, will govern this session just as much as any other meeting of the organization

It is hoped to make this Session of sufficient interest and appeal that it can be-

come a permanent part of the meetings of the A M A. This, of course, will only be possible as a result of the interest manifested in the Session. Every member of the American Medical Association and particularly those interested in the Federation of American Sanatoria are most cordially invited and urged to attend the Session and aid it by their helpful discussions

C H C

The Pneumothorax Directory PNEUMOTHORAX is now more widely used than ever before. As a result, there has been a large increase in the number of patients under pneumothorax treatment in all parts of the United States. Many of these patients lead a fairly active life, and many of them travel, some out of necessity and others for pleasure, most of them with the consent of their physician

When a pneumothorax patient contemplates a trip, it has always been a problem for his physician to assist with his itinerary, which of necessity should include the consideration of when and where he may receive his refills

To the individual patient, for whom the loss of his collapse might spell disaster, it is very important that his refills be continued at the proper intervals during his travels. Then, again, there is the patient who is about to leave the sanatorium and it is necessary to select a physician, in close proximity to the patient's home, who is equipped to continue the pneumothorax treatment. Also, the physician in the general practice of medicine should have available for ready use, a pneumothorax directory for referred patients

For these reasons, the Federation of American Sanatoria is now compiling a Pneumothorax Directory that will give complete information concerning physicians in the private practice of diseases of the chest who administer pneumothorax

We feel that this directory will prove useful and that it will work in the interest of both the patient and the physician, and

that it will serve to better acquaint the physician with those men who are thoroughly equipped to administer pneumothorax and in whom both he and his patient may have every confidence C M H

Negro Health Week THE 22nd Annual Negro Health Week will be observed throughout the United States, March 29th to April 5th, 1936 The United States Public Health Service, State, County and City Health Departments are co-operating with the National Medical Associations, the Negro National Business League, and the National Negro Insurance Association, in holding this important health week.

Through this great movement much progress will be made in furthering the health conditions of the negro race, especially by the continued co-operation of the above named agencies C M H

To Believe or Not to Believe NOW AND AGAIN we are warned that the tuberculosis problem is solved and that, from inference at least, there will be no tuberculosis shortly How shocking then to learn of our high morbidity and mortality incidence among Negroes and Indians for example Of course the clinician who sees the advanced case in his practice and in the sanatorium is not easily encouraged to contribute to the insignificance of tuberculosis even among our enlightened white race, armed by all the weapons knowledge has to offer, and still unprotected from the white plague Although reasoning and philosophy have no place in our modern scientific calendar, yet, as long as we only hear of educational diagnostic campaigns and do not enforce them, we should be permitted at least reasonable questions concerning our blessed oblivion A few questions at random remind us that the dark ages of tuberculosis have not passed Can we with any certitude tell our patients where the tubercle bacillus came from and why it is so persistent in its survival in the human being? I would remind you of the recent discourses on filterable and easily changed

forms Koch first described a spore form and then denied it Which is correct? How long will it be before we can tell our patients that they are free from tuberculosis, or vice versa, and not err? Can we say that tubercle bacilli can pass through normal organs or not? When is a patient a closed case? Have you been fooled also? Can you blame the skeptics when it comes to the value of treatment, and especially collapse therapy? We are convinced, but remember they, as skeptics, should spur us on to a better solution, and until then, tuberculosis will still remain a specialty, we hope not for long, but while it lasts, let's face it conscientiously and diligently Yours for the answers to these and many more questions on our hobby, which space will not permit here A M

National Tuberculosis Ass'n Meeting THE 32nd Annual meeting of the National Tuberculosis Association will be held in New Orleans April 22nd to 25th, inclusive

The preliminary report indicates an interesting program which is especially well balanced A very important symposium on "Tuberculosis in Youth" will be given on Friday, April 24th at 9 30 a m Also there will be an interesting discussion "Putting our knowledge of tuberculosis to work through the Physician" This discussion will be held on Friday, April 24th at 2 p m In our opinion the above subject will cover one of the weakest links in our anti-tuberculosis campaign We feel that the physicians themselves, when properly versed in modern concepts of the tuberculosis problem, will do more toward the control of tuberculosis than any other agency The above discussion should prove to be very timely The whole program, however, is very interesting and we urge all our readers to attend this year's meeting at New Orleans C M H

Write or wire now for reservations for the Kansas City Meeting Headquarters Ambassador Hotel, W W Buckingham, M D, Chairman Committee on Arrangements, 814 Professional Building, Kansas City, Missouri

Indications for Pneumothorax*

IT HAS been conceded for many years that rest is the important factor which enters into the curing of

BY
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Allentown, Pa.

any organ of the body. It has been found that in surgical tuberculosis rest plays the most prominent part of the treatment. It has been recognized for the last ten years that this also applies to the lung. In 1822 James Caïson, thinking over the serious accidents which happened to many of his advanced cases of tuberculosis when a spontaneous pneumothorax took place, realized that in many cases this spontaneous pneumothorax was a beneficial procedure for, although many of them died immediately, many others were benefited by the happening. Thus he conceived the idea that it might be well to effect an artificial pneumothorax.

In 1822 he published a paper about this and a man named Sloan, who was suffering from tuberculosis, came to Caïson and presented himself for this treatment. Four members of Sloan's family had died with tuberculosis and he had just returned from the West Indies where he had gone in an unsuccessful search for health. Caïson and one of the big surgeons, Bickleman of London, attempted to do this artificial pneumothorax by the open method. They cut down through the intercostal muscle, through the pleura, and attempted to puncture the pleura, believing they could, perhaps, let air in from the outside. Unfortunately, Sloan was not a good case for experimentation. He was an advanced case, with dense pleural adhesions and it was impossible to separate the pleura. Caïson was discouraged and did not again attempt it until years later, and again was unfortunate in his selection of a case and was unable to do it. In 1894 Foïlanini, thinking along the same line as Caïson, attempted it much after the technic we use to-day

and was apparently more fortunate in his selection of a case, this man had a free pleura and he was

able to induce some air. That same year in Chicago, Murphy, working along the same line and without any thought of the work Foïlanini was doing, was struck with the same idea and was able to successfully carry it out.

The operation did not come into favor immediately, but in the last ten years much work has been done on it. The technic has been bettered greatly though I believe we are not yet at the end. The aim of this procedure is to introduce into the pleural cavity air or gas which will compress the lung and put it at rest. Rest is just as essential to the lung as to any other organ. When we realize that the lung moves up and down at the rate of about 23,000 times a day, that it never rests, that it is always in a state of distention, that even the strongest exhalation does not expel all the air, that the air cells never approximate each other, we are impressed with the quantity of work this organ must do. The present plan calls for introducing air at atmospheric pressure or greater, this overcomes the condition of negative pressure which is the normal condition of the pleural cavity, expresses air out of the air cells and in so doing collapses the lung. The completeness of the collapse depends more or less on the amount of pleural adhesions and the location of such adhesions. As a result of this procedure the lung is immobilized, the 23,000 movements a day are ceased, no air enters into it. The same procedure takes place when a surgeon puts a splint on a broken arm. The splint does not heal the arm any more than the air in the pleural cavity cures the lung, but with the lung at rest the diseased part has a chance to heal.

There is also a relaxation of the elastic tissue taking place as a result of this

*Read at Pennsylvania Tuberculosis Society, Allentown, Pennsylvania, Feb. 25, 1929.

compression One of the greatest benefits derived is that the lung empties itself of its contents. We are often asked by our patients why, when the lung is collapsed, they do not get well immediately. They are not able to see the process that is taking place. I should like to compare this process with that which takes place in an old sponge which has become very much soiled from neglect and has not a pleasant look nor a pleasant odor. We can conceive it being filled with water and after the water is squeezed from it, being of much smaller volume, but we must remember we still have the same old dirty sponge, we do not have a new, sweet smelling sponge, a delight to feel and handle. The same thing applies to the lung that has been emptied of its air, we still have the same pus pockets, we still have the walls of the cavities which have been filled with pus, we have the lung exactly the same as we had it before we did the artificial pneumothorax but minus the air and minus much of the pus which has been squeezed out. The fact that it is quiet, the fact that we have now approximated the alveolar walls, brings about the healing of the diseased areas and also prevents a spread of the toxin through the lymph channels.

One of the most beneficial effects as I see it is that mixed infections cannot enter the lung. I believe that most of the unpleasantness of tuberculosis is due not so much to the tuberculosis itself as to the mixed infection, entering through the bronchial channels and coming in contact with the toxin of the tubercle bacilli and the diseased areas. It is this infection which causes in great part the night sweats, headaches and extremely high temperature we so often encounter. I believe the straight tubercle bacilli seldom causes a temperature of 103 and 104 degrees. This, however, is found in many cases when a mixed infection gains access to the lung.

Artificial pneumothorax also prevents a spread of the disease to the other lung. You can very readily understand that when a person is an open case and ex-

pectorates billions of tubercle bacilli, many others are not expectorated but are lodged in the bronchial tubes and are very easily inspired into the contralateral lung.

It is believed by some authorities that the reason certain cardiac cases with the weakened compensation show so much resistance to tuberculosis is due to the passive congestion which takes place because of the broken compensation. They believe that this passive hyperemia is a detriment to the tubercle bacilli, that it enters much into the defense of tissue. The same condition is found in a lung that has been subject to artificial pneumothorax, the blood stream is slackened very appreciably. Not only is the blood stream slackened but the lymph stream is also compressed.

The lymph stream plays a great part in carrying the tubercle bacilli from one part of the lung to another and when this lymph stream is compressed and slackened, this passage is broken. This was demonstrated some years ago by a German who compressed the lung of several animals and then compelled them to inhale large quantities of soot. The autopsy showed that the uncompressed lung was much more filled with soot than the compressed lung.

Selection of Cases—All cases are not suitable for artificial pneumothorax and it is difficult to know which case will respond more readily. Many cases which we consider absolutely unsuitable give us the best results, and vice versa.

Acute Progressive Case—The acute progressive case may be particularly suitable and give us good results at the time but later we are often much disappointed to find the case begins to slip and does not respond to the treatment in the manner we hoped. This is due to the fact that the resistance in the acute case is very low. They have not had time to build up this resistance, with the result that walls break down, disease spreads and the case terminates unfavorably.

Chronic Cases—A chronic case, on the other hand, which may not seem to be

a good case at the start, may respond very well even if pleural adhesions prevent a complete collapse. This is due to the fact that these cases *have good resistance*. Over the period of years which the patient has been afflicted he has built up this resistance that is so vital and so important as a curative factor.

Cases Not Doing Well—Then we have the cases that are not doing well under general treatment. It is conceded by all men who do tuberculosis work that many cases do well under the ordinary regimen—rest, fresh air and good food. Here again it is difficult to tell which case will get well, and again it is the question of resistance. In fact the question of resistance in tuberculosis is the main factor, determining whether the case is going to get well or going to slip, and entering into the pneumothorax case it must be given the same consideration as in every treatment. These cases, not doing well under general treatment, should undoubtedly be given the benefit of artificial pneumothorax treatment. The fact that the case is one of fibrosis does not interfere with this selection even though both lungs are involved. This is especially true if there is cavity formation in one. It is important, however, that this cavity does not have thick walls, but here again we will find that if we follow this rule too closely we will miss many cases which might have been benefited.

Cavities—It is safe to believe that in all treatment of tuberculosis it is imperative to close all cavities, either small or large. I believe we will get very few cures in cavity cases unless this law is observed. Pneumothorax will accomplish this in many cases.

Many times it is necessary to assist the pneumo with some method of phrenic nerve treatment or, in case of adhesions holding and preventing closure, by pneumolysis. If these do not suffice, and other conditions warrant it, a thoracoplasty should be considered.

Hemorrhage—The most spectacular case which enters into the treatment is that of hemorrhage. I know of no way

to control a hemorrhage except by compression. I know of no drug that has any influence on it, but often after the induction of 300 or 400 c.c. of air, which seems in many of these cases to have a selective action and goes to the weakened place, the result is astonishing—the hemorrhage ceases. In attempting this procedure on hemorrhage cases we must remember that we are dealing with an already broken lung. If our enthusiasm or our fear compels us to proceed with too much haste, putting in large quantities of air without knowing the condition of our pleura, without knowing whether the tuberculous process has worked out into the visceral pleura and already caused an adhesion between the visceral and the parietal pleura, we may do more damage to the patient than the hemorrhage is going to do, because an excess of pressure may pull off a part of the visceral pleura. If we do this we get a spontaneous pneumothorax with resultant pyopneumothorax.

Even a small quantity of air seems to have a selective action. This is due, of course, to the fact that in the involvement of the periphery of the lung, this area is much softened and the air is able to exert much more pressure on the softened area than it does on the well portion of the lung.

Sometimes it is very difficult to know from which side the hemorrhage is coming. You must then use your own judgment and if, after several air treatments, the hemorrhage persists, I believe you should discontinue the treatment on the supposedly involved lung and induce pneumo on the other side. In our experience this has been successful in several cases.

Bilateral Cases—The fact that both lungs are involved is no contraindication, provided the one side is fairly good. Most of our artificial pneumothorax cases have bilateral tuberculosis. There is a compensatory emphysema which takes place in the contralateral lung causing a dilation of the alveolar walls and the bronchioles so that the patient is using just as much

air as before the one lung was partially collapsed. However, this is not always true. The strain of adjustment for the other lung, which is also somewhat involved, may prove too great for it and it may break down and may even go on to hemorrhage. It is then a question of determining the right procedure—whether to risk small hemorrhages in the contralateral lung and continue pneumothorax on the badly diseased side or allow the badly diseased side to reexpand, perhaps helping it to reexpand by drawing air out of the pleural cavity, and then instituting a partial pneumothorax on the heretofore contralateral side.

It is important and good common sense that in bilateral cases both sides should not be started at the same time. Sufficient time should be allowed for the stabilization of the circulation, both respiratory and cardiac, to take place before attempting the closure of the contralateral lung. If this precaution is taken it is remarkable how well most patients handle a bilateral operation.

In some bilateral cases we find a walled cavity in one lung and evidence of a more acute spread in the other lung. Matson has suggested closing the recent involvement first, disregarding, for a time, the cavity. He has found it is often possible to bring enough pressure on the cavity by displacing the mediastinum, thereby getting beneficial results. We have tried it several times and are well pleased with it.

Advanced Cases—Some believe that all advanced cases should be given a chance with artificial pneumothorax and this seems logical to me. Ten years ago Fishberg felt that only the acute and apparently hopeless cases should be given this treatment. Many authorities differed with him then and I think many more differ about it today. My own opinion is that in five years from now we will be using artificial pneumothorax in many cases where today we are not considering the treatment.

Spontaneous Pneumo—A spontaneous pneumo should always be converted into

an artificial one. Great care must be taken not to increase the rupture. This is where the x-ray plate and the fluoroscope are so important.

Positive Sputum—Positive sputum is always an indication for pneumothorax treatment. While it is true some cases after four or six months of bed rest become negative, yet I see no reason to wait if it is possible to do a pneumo.

It must be remembered that if we wait too long there is always the possibility of adhesions forming which may minimize the results of our treatment. Of all the forces that lessen the value of the treatment certainly adhesions play the biggest part. We must always keep in mind the possibility of a spread to the other lung.

Pleurisy With Effusion—I believe that in all cases of pleurisy with effusion the fluid should be aspirated and replaced with air. I do not believe that we should strive for a complete collapse in all cases but in many cases of tuberculosis, pleurisy with effusion is one of the cardinal symptoms. If we allow the inflamed pleura to contact, all hope of doing a later pneumo is lost. This neglect will lead to much regret later on in the cases we were led to believe were not of tuberculous origin.

Contra-Indications—At Devitt's Camp we recognize few contra-indications. The *acute milary tuberculosis* is certainly one. The disease advances so rapidly and in many cases so much damage to tissue takes place even before a diagnosis can be made that this type of treatment seems to be of no avail.

The *dense fibroid cases with emphysema* are not suitable unless there is a bleeding cavity or one that we are afraid will bleed, even then this is only at best palliative treatment and no beneficial ultimate results can accrue from it.

We do not recognize *involvement of the larynx or intestines* as a contra-indication unless these conditions are severe. Fishberg, however, found that all of his pneumothorax cases that died suffered from

(Continued to page 26)

The Responsibility of the General Practitioner in the Treatment and Prevention of Tuberculosis

WHILE it should be self-evident that medicine owes the same duty to the tuberculous patient that it

BY
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owes to one suffering from any other disease, yet until now it has not recognized this duty. In recent years, however, the fact that tuberculosis has been proved to be a curable and preventable disease is forcing physicians to accept it in the same spirit that they accept diseases of the heart, of kidney, of pneumonia and diabetes.

Since 1900 the death rate from tuberculosis in the United States has fallen from 200 per hundred thousand population to less than 60 per hundred thousand. Does this bear the interpretation that our problem is seven-tenths solved, and that our death rate will continue to lessen at the same pace, and that the remaining three-tenths will be wiped out in another fifteen years? I am sure that no optimist expects such a result. However, optimistic students of the problem expect further reductions to be slower, but yet to be accomplished at a gratifying rate.

No doubt the progress made so far has been in some respects the easiest because tuberculosis has been so common that every one has been acquainted with it and nearly every one has felt its heavy touch upon some member of his family or upon some intimate friend. The reduction of the number of deaths from 200 per hundred thousand to 60 is reducing the acquaintanceship with the disease to such an extent that we already hear its relative infrequency commented upon.

If the recognition of this decreased frequency should carry with it the recognition of its curability and preventability, all would be well and good. On the other hand, if it should carry such a feeling of security as to breed a tendency to lessen the vigilance which has made the accomplishment possible, then the result would be disastrous.

In the future it may be much more difficult to hold the interest of organizations which have been in

the forefront of the battle against tuberculosis than it has been in the past, so we must supplement that part of lay interest which has been due to self-interest because of fear of the disease, by an awakened interest on the part of the general medical profession. The humanitarian aspects of the disease may be expected to continue to interest both physicians and laymen.

Physicians who graduate today have their minds more on chronic disease than formerly was the case, because of the decline in incidence of the acute infections, on the one hand, and the increase of the degenerative disease due to our aging population, on the other hand, so it will not be out of line for medical practitioners who are graduating today to develop an interested understanding of the problems associated with the diagnosis and treatment of tuberculosis.

While it is true that the diagnosis of tuberculosis requires a somewhat different approach to the patient than some of the diseases in which the profession has been more intimately interested, yet the approach is simple and rational and within the grasp of every well trained physician. The treatment of tuberculosis requires on the part of the physician, aside from a fundamental knowledge of the disease, and understanding of the physiologic principles which are essential to its healing, a peculiar psychology which enables him to maintain an interest over a period of months during most of which time the patient may feel in a state of almost perfect health. While this psychology may not be attained by all, yet it is quite reasonable to expect physicians to know the measures which are used therapeutically and if unable to apply them, themselves, to refer the patients to those competent to do so.

The field of diagnosis can be taken over

by general medicine except in the most difficult cases. The average case presents little difficulty in diagnosis because the disease is usually well established when a physician is first consulted. Unless patients present themselves for examination earlier in the future than they have in the past, not more than twenty per cent of cases should give the general man any great difficulty in making a diagnosis. They might experience difficulty, however, in estimating the severity of the lesion and in choosing the particular therapeutic measure or measures which would offer the best chance of cure.

I have long taught that general medical men should accept tuberculosis as a disease which should receive their best endeavor the same as such diseases as those of the heart, gastrointestinal tract, and kidney, and then study it so as to give themselves confidence in dealing with it. Then their apathy would soon be replaced by an intelligent interest. Then better and

earlier diagnosis would be the rule. This is a duty which the profession owes to itself, as well as to the tuberculous patients who consult them.

A carefully taken history with an analysis of the symptoms, a good X-ray plate, and a proper examination of the sputum should enable the physician to detect at the time of the first examination most of the cases that seek medical aid. Where uncertainty exists a careful study of the history will usually help the examiner decide whether or not further study or consultation is necessary.

For more than twenty years I have been making use of an etiologic classification of symptoms. By considering symptoms in connection with their etiology it has helped me very much in determining the presence or absence of activity, and I recommend it to the general man as being of great value. The classification is as follows:

Etiologic Grouping of Common Symptoms of Pulmonary Tuberculosis

GROUP I SYMPTOMS DUE TO TOXEMIA	GROUP II SYMPTOMS DUE TO REFLEX CAUSE	GROUP III SYMPTOMS DUE TO THE TUBERCULOUS PROCESS PER SE
Malaise	Hoarseness	*Frequent and protracted colds (tuberculous bronchitis)
Lack of endurance	Tickling in larynx	
Loss of strength	Cough	Spitting of blood
Nerve instability	Digestive disturbances	Pleurisy (tuberculosis of pleura)
Loss of appetite	which may result in	
Digestive disturbances	loss of weight	Sputum with or without
(hypomotility and	Circulatory disturbances	bacilli
hyposecretion)	Chest and shoulder pains	
Metabolic disturbances	Flushing of face	
resulting in loss of	Spasm of muscles of	
weight	shoulder girdle and	
Increased pulse rate	crus and central tendon	
Night sweats	of diaphragm	
Elevation of temperature	Diminished motion of af-	
Anemia	ected side Lagging	
Leucocytic changes	If chronic, degeneration	
	of apical soft tissues	

*Strictly speaking, colds should not be listed among the symptoms for the "cold" as so often described is a syndrome of acute spread of infection, a large inoculation with tubercle protein, or calcification and cavitation.

This classification shows the three factors which are operative in producing symptoms the toxins, with their action upon the nervous system, the endocrine system, and the cells of the body, the reflexes, which are transmitted through the vagus and sympathetic nerves which supply the lung, and the tuberculous inflammation locally in the lung and pleura

It readily will be seen that the toxic group is only present when the disease is active and the patient is absorbing poisons, a condition which is often absent for quite long periods during the chronic course of tuberculosis. One must expect to find these symptoms only when the disease is distinctly active. Some of the reflex symptoms, however, will remain even until the disease is healed.

The most significant of the three groups of symptoms is the one caused by the tuberculous process *per se*, because these are produced in the tissues where the inflammation exists.

Hemorrhage is due to the inflammatory condition producing injury to the local blood vessels.

Pleurisy is caused by a subpleural involvement, or an infection of the pleura itself.

Sputum is a result of the inflammation in the lung stimulating the mucous cells, or producing necrosis of tissue in which case the focal contents with bacilli are expelled. If the sputum contains tubercle bacilli, of course, the diagnosis is readily made.

However, it is important that the physician understand something of the accuracy of sputum examination. Any case which is decidedly suspicious should not be turned down as being non-tuberculous simply because bacilli are not found by the ordinary method of examination, for it requires the presence of large numbers of bacilli to find them by the usual Ziehl-Nielsen technic.

Hemorrhage, if it consists of an amount approaching a half teaspoon of bright blood, should be considered as coming from a tuberculous focus, unless proved otherwise. Other causes of spitting of

blood are bronchiectasis, lung abscess, malignancy, and certain other rare infections.

Pleurisy, whether it be dry or pleurisy with effusion, is nearly always tuberculous if it comes on without some definite cause such as pneumonia, or an injury to the ribs.

Frequent and repeated colds can not be strictly interpreted as a symptom of tuberculosis, because it is a syndrome of increased activity, in which numbers of symptoms are present. Nevertheless, it is a frequent complaint of the patient.

An analysis of the symptoms according to this classification will prove to be very helpful—more helpful than considering each symptom as an entity. This classification shows that there are three factors and not thirty or forty individual symptoms to be considered. Rarely is active tuberculosis present without more than one group of symptoms being represented.

The medical man who first sees the tuberculous patient can render a service for which he can never be adequately remunerated, by advising him how to conduct himself so as to minimize the danger of further spread of the disease and of its further breaking down. Oftentimes the correct advice at this time will save months of treatment, reduce the crippling effects of the disease to a minimum, and may even save life. The confidence which patients put in the medical profession demands intelligent advice at this crisis.

The patient suffering from active tuberculosis harbors as great a threat to life as the one with acute appendicitis, yet the chronicity of the disease clouds the prognosis. The death of the tuberculous patient four or five years after the disease has been discovered is no less the result of a failure to properly advise than the death in appendicitis which takes place a few days after improper advice is given.

Active tuberculosis calls for immediate rest and the establishment of a properly devised hygienic and physiologic regimen just as much as appendicitis calls for

surgery What further will be needed is not so urgent

The general physician must know the principles of treatment and see that they are applied at once on a diagnosis of active tuberculosis having been made While there are certain cases in which there may be little danger of doing harm by a less strict regimen, yet these require a more comprehensive analysis than would be expected of one who sees only a case now and then So for safety, bed rest should be ordered until it is definitely determined how and by whom the patient is to be treated If the physician is able and sufficiently interested to carry out the treatment himself, the permanent regimen should be established at once If not, the patient should be quickly referred, for time is often an important factor in determining the future usefulness and even the life of the patient If the physician does not have the confidence in his own ability to handle the acute phases of the disease, he could advantageously send his patient to some well conducted sanatorium for education and treatment until this phase has passed This educational phase of sanatorium treatment has not been sufficiently emphasized in the past

Not only can the general physician who is tuberculosis-minded and who has confidence in his ability to render service to the tuberculous patient diagnose the disease and establish and decide the nature of the treatment, but he can render another great service by examining those who have come intimately in contact with open cases It is not difficult to give a tuberculin test, it is nothing that any graduate in medicine can not do after a few moments of instruction

In case any one who has come in contact with an open case reacts to tuberculin, an X-ray should be taken to see if the pulmonary tissue is involved If the X-ray shows the infection to be confined to the primary focus and regional glands, and if no evidence of activity is present, no treatment need be instituted However, reactors should be re-examined at intervals of from three to six months, and at any time

should there be any evidence of interruption of the normal well-being of the reactor

The physician should be careful to explain that while reaction means infection, it does not mean disease The test is protective, particularly in children, in that it puts the family physician in possession of the knowledge of the fact of infection and permits him to guide the child during the period of development

What greater service can the general physician render to any family than to diagnose tuberculosis at once should any member become afflicted, apply the proper treatment when it is diagnosed, and study those who have been exposed, and reassure them that no infection is present, or pick out any that may have become infected with the assurance to the family that with proper guidance there is little likelihood of their breaking down

This is the type of service that general physicians can take the responsibility of rendering if only they will This is the type of service that will insure a continuation of the decline in the death rate of tuberculosis, and a merited confidence in medicine on the part of the public

Convention THE May issue of DISEASES OF THE CHEST will be a special convention edition and will be dedicated to the progress made in combating tuberculosis in Missouri

The papers for this issue will be contributed by the physicians of Missouri, who have had an important part in and are especially trained for tuberculosis work Important phases of tuberculosis activities, including data and photographs of the sanatoria of the state will be a feature of this issue

The committee in charge is making every effort to pay a tribute to the State of Missouri, which is honored this year in having the meeting of the American Medical Association at Kansas City

Murray Kornfeld, managing editor of the DISEASES OF THE CHEST is establishing headquarters at Kansas City to assist the committee in compiling this *Special Missouri Edition*

The Diagnosis of Incipient Pulmonary Tuberculosis

THE DIAGNOSIS of incipient pulmonary tuberculosis has long been looked upon as a difficult task

BY
JOHN B. HAWES, 2nd, M.D.
Boston, Mass

and an intricate procedure involving special knowledge and facilities. This is not the case. An early diagnosis of tuberculosis depends upon three factors, each of which is well within the reach of any practitioner. These three basic factors are

1 That the physician takes the time necessary to get acquainted with the patient so that he will be at ease and so that he may bring out the essential details of the patient's story

2 Next, willingness on the part of the physician to weigh each symptom carefully and to pick out the essential points brought out in his subsequent physical examination. This in every case should include records of temperature and pulse, not in the doctor's office which are of little or no value but taken quietly at home under *normal conditions*. Having secured all this data, taking time to go over all of this carefully, eliminating the non-essentials and retaining only that which has a distinct bearing on the case

3 Finally, securing additional help in the way of an x-ray examination *interpreted by an expert* along with certain laboratory tests, chiefly the examination of the sputum

The task of obtaining all this is not difficult providing the physician is willing to *take the time*, nor need it be unduly costly. With this evidence at his disposal he should be able to answer these three questions

(1) Has this patient tuberculosis of his lungs?

(2) Is the disease in active form and is it the cause of his symptoms?

(3) If so, what should be done about it?

Now let us take up more in detail the procedures outlined above necessary to make a diagnosis of incipient tuberculosis.

First comes the patient's own story. This cannot be hurried. At all times and in every case it is important to bear in mind that one is dealing with a human being worried and apprehensive and *not* with what may or may not turn out to be merely a case of tuberculosis. At the beginning it is well to ask the direct question, "What brings you to my office?" and to follow it up with another one, "When did you last feel perfectly well?" With this as a starting point, continue from there on. Bear in mind that any cough or cold with or without sputum which lasts from 4-5 weeks should be investigated. It may not mean tuberculosis but it *does* mean something. Remember likewise that there is no cough which is typical of tuberculosis. Hacking coughs, dry coughs, chest coughs or that mysterious stomach cough mean nothing as far as tuberculosis is concerned. Raising of blood *in any quantity* should be investigated while if the patient states that he has raised as much as a *teaspoonful* of blood the physician may well feel that tuberculosis is present until the contrary is proved. A history of pleurisy with effusion justifies a tentative diagnosis of tuberculosis. Loss of weight is only important providing it *cannot* be explained. Dietary fads are so frequent nowadays that the fact that the patient has lost 15-20 pounds may and often does mean little or nothing. Loss of strength and energy although important if proven is a vague affair at best and always difficult to evaluate.

Above all, put no faith in what a patient may say concerning the presence or absence of a fever or a rapid pulse. In every case secure this data for yourself. Likewise, put no faith in temperature and pulse observations taken in your own of-

fice Show the patient how to use a thermometer and how to take his own pulse, give him a chart with directions to take temperature and pulse in the late afternoon and in the evening—at 4 and 8 p m—for three or four days and have him send this chart to you This is the only way to get accurate information on this subject For over 25 years this has been my invariable custom and it has been only in the rarest instance that a few minutes' instruction has failed to instruct the patient in accurate temperature and pulse observations

In your physical examination see that sufficient clothing is removed so as to enable you to examine easily every part of the chest In going over the patient's lungs in every case remember what you are looking for, namely, *localized persistent rales*, usually at an apex Percussion is coming to be a lost art although in the hands of experts it gives much valuable information Palpation and inspection usually yield comparatively little but if on using the stethoscope one hears *fine crackles* at one apex and if these persist after the patient has been taught to cough and then to breathe in and out immediately afterwards, you have sufficient evidence on which to base a provisional diagnosis of tuberculosis at least Changes in voice or breath sounds in the early cases are not particularly important One may truthfully say, therefore, that just as the presence of tubercle bacilli in the sputum makes the diagnosis a definite one while the absence of such germs proves nothing at all, so the elicitation of fine, cracking rales which persist after the patient has coughed is an important point in your positive diagnosis, but likewise, the fact that such rales are *not present* does *not* prove that tuberculosis is *not* the correct diagnosis I have often felt that in the detection of these early cases if the stethoscope were used less and the thermometer and observations of pulse used more fewer mistakes would be made

Now we come to the x-ray Formerly, the expense of an x-ray examination often prevented the obtaining of this important

evidence Nowadays when clinics and dispensaries, sanatoria and hospitals so abound there is no excuse for not having the help of an x-ray examination in every case where tuberculosis is suspected If you are not accustomed to reading x-rays yourself, do not attempt to do so in this instance In most cases the practitioner is quite at the mercy of the roentgenologist If he is a conservative and sound man he will report to you as to his findings which may be, for instance, that there is "diminished radiance" and "evidence of parenchymatous infiltration at one apex" which is *probably* of tuberculous origin or which *suggests* an early tuberculosis process If, however, he attempts to state whether that aforesaid process, the shadow of which he sees on the x-ray film, is active or inactive and *is or is not causing symptoms*, I should be inclined to disregard his report altogether and to take the film and to have it interpreted by someone else I am firmly of the opinion that it is only in the *rarest of instances, if ever*, that the roentgenologist is entitled to give a definite opinion concerning activity or inactivity He might well say, and often has a perfect right to say, that *in his opinion* the shadow, from its "haziness" or "softness" or its "snow-flake" appearance *suggests* activity Further than this he has no right to go It is the duty of the patient's physician from his own observation of temperature and pulse and from his careful sizing up of other signs and symptoms elicited from his history and examination to decide whether or not the patient is suffering from *active* pulmonary tuberculosis

Finally, a word concerning laboratory tests Of these, the examination of the sputum is the only one of real importance, certainly from the point of view of the general practitioner Tuberculin tests, blood studies, sedimentation rates and others may well be left to the specialist and to the laboratories and institutions for tuberculosis Remember, however, as I have emphasized early in this

(Continued to page 28)

Calcium Therapy in Tuberculosis*

THE utilization of calcium as a therapeutic agent in the treatment of tuberculosis has been

BY
BENJAMIN GOLDBERG, M D F A C P
Chicago, Ill

based for many years on the supposed demineralization theory. Many writers reported an excess of calcium salts in the urinary and alimentary excreta in the presence of active tuberculous disease and therefore felt it was necessary to replenish the body tissues. In discussing calcium, we do not lose sight of the other mineral salts (phosphorus, etc.) which have important parts in body function, yet are little understood.

In recent years considerable experimentation in this field has given rise to many new ideas as to the value of this substance. Many investigators have attempted through feeding calcium or calcium compounds to increase the deposition of lime salts into areas of tuberculous disease in the hope of creating calcification which would result in healing. This only occurs in a very small proportion of patients with the disease. There is, however, at the present time a definite understanding that an increased calcium intake in itself does not affect the blood or tissue calcium unless certain activating substances are present to aid in the tissue deposition of calcium with a consequent increase in its absorption.

Some studies in tuberculosis that relate to calcium have resulted in definite conclusions. Peterson and Levinson have reported more deaths among tuberculous patients with a low blood calcium. Those patients with a higher blood calcium evidenced a healed or healing lesion and, therefore, a good prognosis. There were, however, instances in their series in which a high blood calcium was found, associated with an advanced lesion, which change these investigators attribute as due to a transfer of the calcium from disintegrated tissue to the blood.

Cantarow reports that in a series of pa-

tients with a chronic fibroid tuberculosis a considerable variation in respect to the diffusibility

of the serum calcium was present, an increased diffusibility in active exudative cases, and a decreased diffusibility in benign proliferative types. Cantarow, also, in studying the diffusible calcium ratio in sixteen patients having advanced exudative lesions, all clinically active, four of which patients were critically ill, demonstrated a diffusibility ratio of 117 to 152, the ratio in normal, healthy individuals being 82 to 115.

In a series of eleven individuals with fibroid tuberculosis, none of whom were critically ill, the diffusibility ratio varied from 56.7 to 80.1. Thirty-six patients showed a normal range—82 to 115—these latter all having chronic ulcerative tuberculosis in varying stages of activity. In this latter group there appeared to be no correlation between calcium distribution and the nature or extent of the pulmonary lesion. Increased diffusibility of blood calcium denotes increased permeability and it appears that an increased ratio of diffused to non-diffused calcium is associated with the exudative types of tuberculosis, while a subnormal diffusibility ratio occurs in proliferative or fibroid tuberculosis.

Peterson, with his "blister test", shows the presence of diminished permeability through the skin capillaries in fibroid tuberculosis, but in the exudative types of the disease the permeability seems to be definitely increased.

One might also mention the work of Ellman, who, recognizing the place of the parathyroid gland secretions in calcium metabolism in the body, studied the histologic structure of such glands in the tuberculous and noted evidence of increased function in such tissue sections, which would, according to this worker, depict the need for an increased calcium intake.

*From *Clinical Tuberculosis* by Benjamin Goldberg
Published by F. A. Davis, Philadelphia, 1935.

The work of Peterson and Levinson in capillary permeability, and my personal work with Reed, has led me to feel that calcium is important and that its value in tissue reactivity is to stabilize tissue cells and to control the phenomenon of sensitization or allergy. In tuberculosis this may be summed up as follows:

Initial or primary infection in the human host creates a sensitization or reactivity of tissue to further infection with tubercle bacilli. This sensitization or reactivity is manifested in its most minute form by cell irritability, which when marked, allows of increased cell permeability and, therefore, increased capillary permeability. A new infection with tubercle bacilli stimulates this sensitization procedure so that exudate is poured out as a result of cell irritability and permeability. Such exudate may either fix the bacilli in situ or may also be an attempt on the part of nature to wash these irritating bacilli from the tissue cells where they have settled.

This is normally considered a defense reaction on the part of tissue cells in the presence of organisms which may propagate, but where extensive exudate is thrown out and carries bacilli, invading new tissue, it may create new pathological entities and endanger the patient. The degree of tissue reactivity and capillary permeability, resulting from the irritation of the infecting organism, is dependent upon the irritability of the single cells and the permeability manifested by such cells. An increase in the calcium content of the body tissue and blood apparently tends to lessen cell irritability and capillary permeability, thereby lessening the amount of exudate, hardening, as it were, the fixed tissue cells, preventing an extension of the infecting organisms and tending to limit the destruction by their toxins.

The improvement of calcium metabolism in the body seems to be largely dependent upon certain specific activating substances, of which the most important to our knowledge, at this time, is vitamin D. Before discussing the role of

vitamin D, I would mention other associated conditions which effect this metabolism.

When taken into the body by the alimentary tract, calcium absorption is based on several factors. The hydrogen ion concentration of the small bowel is important, inasmuch as an alkaline medium tends to cause insoluble calcium salts. Kahn and Roe have shown adequate absorption in calcium feeding when calcium is given between meals, at which time intestinal alkalinity is not so marked. Bernheim states that the fats may through combination with calcium, form insoluble soaps, and oxalic acid found in some vegetables may form insoluble calcium oxalates. An excess of phosphorus in proportion to calcium may also form an insoluble tertiary calcium phosphate. Bergeim demonstrated increased calcium and phosphorus absorption in the presence of calcium lactose feeding because of increased acidity, due to lactic acid fermentation. Mellanby has determined that decreases in calcium and phosphorus absorption occur with quantities of bread, oatmeal and maize and rice in the diet. It would, therefore, seem important to heed these results of experimentation in calcium feeding.

The amount of calcium to be given and the type of calcium has created controversial discussion. It seems wise in the light of recent work on the importance of phosphorus in conditions where a deranged calcium metabolism is the most prominent clinical feature, to administer calcium in combination with phosphorus. This is warranted on the basis that a large dietary excess of phosphorus inhibits adequate absorption of calcium, and may even draw on the calcium of fixed base reserves of the body, resulting in a negative calcium balance, likewise a large excess of dietary calcium may be expected to combine with phosphorus, drawing it from the body stores, and resulting in its excretion as calcium phosphate. It is by thus feeding a large excess of calcium as compared to phosphorus that rickets is experimentally produced. For this reason it seems advisable to use one of the cal-

cium phosphates Powdered bone meal, essentially tricalcium phosphate, is available commercially, I have used a mixture of this material with dicalcium phosphate The advantage of using such inorganic preparations is that calcium and phosphorus are supplied in approximately the same proportion as is required for the calcification of tubercles Calcium gluconate and lactate may be given for immediate emergency The dosage should be from 10 to 20 grains three times daily to supply evident needs or dietary deficiencies

Vitamin D The efficiency of calcium metabolism is apparently dependent upon the presence of certain conditions in the body, as pointed out above, in addition to the presence of activating substances, of which vitamin D at this time stands out as most important We would not here delete the thought that some of the other vitamin substances may and do act as synergists in stabilizing the mineral metabolism of the body

The research of Mellanby, of Hess, and of McCollum pointed the discovery of vitamin D in foodstuffs, as did Huldshinsky, with ultraviolet light, in determining its anti-rachitic value This anti-rachitic action is dependent upon changes in the calcium and phosphorus chemistry of the body Recent experimentation as to the value of vitamin D has been extended to other disease syndromes, particularly the sensitization or allergic group of diseases

Vitamin D, in sufficient quantities, has the ability to mobilize calcium in the blood, acting singly or possibly through the parathyroid hormone It thus, if given in adequate amounts, may produce a hypercalcemia with increased deposition of calcium into tissue cells, and a resulting increased calcium absorption This complex mechanism of biochemical activity influences cell and capillary permeability and, therefore, exudative processes which are factors in cell reactivity, sensitization or allergy

1 *Codliver Oil*—This oil has been used empirically for many centuries in the treatment of pulmonary tuberculosis with-

out any definite knowledge of its action More recently, with the extension of knowledge of vitamins, has come a realization of its importance in the maintenance of the mineral metabolism in the body through its vitamin D content In addition, it has a liberal vitamin A content, traces of iodine, biliary salts and other substances The fat content is of importance as a food in the patient of poor nutrition Preference is given to codliver oil in vitamin D feeding in the general diet of the tuberculous Cod liver oil here is given in amounts of one-half to one ounce three times daily after meals The codliver oil selected for use should be one of the products of a reputable manufacturing concern with adequate testing facilities Where obesity is present, or additional vitamin D is necessary, a fortified preparation containing viosterol may be utilized, so that smaller amounts of the oil may be given, yet dispensing an adequate amount of vitamin D Where personal distaste to the oil is present, it may be given in such vehicles as orange juice, tomato juice, wine, etc Even in such vehicles patients may manifest digestive upsets or may have other idiosyncrasies and refuse to take this important substance Vitamin D may then be given in the form of irradiated ergosterol (viosterol)

2 *Viosterol* Applying the knowledge that ultraviolet rays had an anti-rachitic factor, Hess and Anderson and Griffith and Spence have shown that the wave lengths most potent in developing this substance existed in the ultra-violet zone between 302 and 265 millimicrons Irradiation of ergosterol with ultraviolet produces a substance which may have a potency as regards the anti-rachitic element ranging from 200,000 to 700,000 times that in the average codliver oil, making necessary dilutions to the potency of 100 times the standard codliver oil, which is the common commercial preparation

The dosage of viosterol which we have used until recently has approximated 20 to 40 drops, using the dropper furnished when the product is purchased

Pulmonary Moniliasis . . .

A Brief Resume of the Clinical, Pathological and
Diagnostic Phases of the Disease and its Treatment

BY

JACK C. NORRIS, M.D.*

Atlanta, Ga.

Historical In a previous report attention was called to Reubold (1), who in 1834, reported that he had found oidia in human respiratory passages. This observation was followed by others, and Raum, in 1891, produced death in a rabbit by inoculating the animal with yeast. In 1894 Busse published his experiences with yeast pyemia, and subsequently numerous other instances of yeast infections have been described in the literature. In recent years Kotts and Fleischer, (2) Lewis (3) and Stovall, (4) have each added considerable information concerning the importance of these fungi, in that they have presented patients with lesions proved to have been caused by pathogenic yeasts. Information is now available of sufficient amount and scientific accuracy to state several positive facts, (a) that certain yeasts are disease producers and (b) that such organisms may infect and damage numerous tissues, especially those of the meninges and the lungs (5).

Bacteriology and Classification The pathogenic yeasts, referred to in this paper, conform to a large group recognized as *Monilia*, which Castellani has classified according to sugar reaction. They may be further classified into two sub-groups, (a) those that produce conidia and ferment several sugars, and (b) those that only grow by budding, and that only ferment an occasional sugar. Other cultural features are usually definite, in that the growing colonies can be easily recognized by their grey-white color, elevation, homogeneity and feathery irregular edges. As a rule these yeasts grow best on acid glucose agar. Repeated transplantation, however, enables them to grow on any enriched

medium. Technically, a culture should be grown many months on various medias, at several different temperatures before their true classification is attempted, or else the organism might be erroneously named. It should be remembered that the yeasts are pleomorphic and full of cultural surprises. Even the better bacterologist may be fooled by their behavior. In our laboratories we make first transplants on Sabouraud's media, from freshly obtained sputum collected in sterile containers, after a thorough mouth cleaning. Colonies are selected on the fourth or fifth day of incubation and are then transferred to a large series of different carbohydrates. Later, we make animal inoculations while the culture are young. For this purpose the rabbit is one of the better animals. The injections are made in accordance with technical procedures, as outlined in a previous report by the author (7). As a rule pathogenic yeasts will produce granulomata about the inguinal glands. If given intravenously, they nearly always produce a severe septicemia with especial involvement of the kidneys, liver, spleen and peritoneum. Nasal instillations often cause a pneumonia or an enlargement of the tracheobronchial glands. Such findings in an animal are of sufficient importance to classify a yeast as pathogenic and are in accord with Castellani's postulates for pathogenicity.

Clinical Features and Occurrences The patient's main complaint will usually be that of a chronic, very productive, cough with sputum of watery consistency that contains much grey-white, semi-coagulated, mucinous material in which may, or not, be small specks of blood. The sputum has often been noticed to have a definite pungent smell, strongly simu-

*From the Department of Pathology Grady Hospital, Atlanta, Georgia.

lating the odor arising from fermenting yeasts. Associated with the cough may be sore mouth, sub-costal pain, occasional irregular fever and headaches. Loss of weight is not an important complaint unless the disease has lasted several months. Physical examination will disclose a few rales most often in the lung bases or about the hilus—seldom in the apices. X-rays in several cases have revealed irregular fanlike areas of increased density in one, or both bases, though in the beginning nothing of importance may be visible in the negatives. Most of the patients observed by the writer were males and as a rule they appeared to have been well developed people before their illness. It is important to remember, however, that in nearly every patient there was a history of another disease. One person had a lung abscess, another stomach trouble and still another heart disease. All of which indicates that the yeasts most likely implant themselves best upon previously damaged tissues. The organisms may be associated with bronchiectasis, bronchitis and streptococcal processes and in children who have thrush. Tuberculous individuals may be affected and the infection may delay recovery from tuberculosis. I have been astounded at the number of instances in which yeasts occur in the sputum of tuberculous individuals. In a survey of two sanatoriums (9) I found yeast in the sputum of 15 per cent of those examined and in a large number of these, tubercle bacilli could not be found in the sputa. This observation seems important for it seems that pulmonary yeast lesions can simulate tuberculosis and such lesions should be differentiated for the former is curable with specific therapy, while tuberculosis consumes months of time and patience, aside from the economic factors involved, and eventually may often prove fatal.

Pathology The histology of yeast lesions has been ascertained through animal inoculations. The pulmonary lesions in the animal consist grossly of small tu-

bercle-like processes of a grey-white color. Historically these areas often simulate atypical tubercles. There are occasional giant cells, numerous fibroblasts, lymphocytes and plasma cells, all of which represent a chronic or slow growing tissue reaction. Within and about such inflammatory areas may be seen yeast cells.

Necropsy studies in the infected human are rare. Lewis (3) described a patient whose lungs had many small pus cavitations about the small bronchioles in which yeasts were present in enormous numbers. Microscopically, Lewis encountered pseudo-tubercles composed of fibroblasts, mononuclears, epithelial, plasma and a few atypical giant cells with an associated marked fibrosis.

The other pathological features of moniliasis are concerned with the blood. Most patients have no increase in circulating leukocytes and instead there is a leukopenia with lymphocytosis. The red cells may be decreased and a moderate anemia may be present. The blood constituents, such as non-protein nitrogen, etc., are not involved.

Complement fixation tests may be positive, with antigens of high title, yet such tests are not diagnostically dependable. Agglutinins are present in the blood but seldom in greater quantities than 1-20 to 1-60 dilutions. An interesting phenomena has been observed in that normal healthy polynuclears will quickly ingest yeasts in large numbers when incubated in blood serum obtained from a patient with moniliasis. Such a reaction is of dependable diagnostic value.

Diagnostic Criteria The patient's sputum should first be examined grossly for the physical characteristics that have been described. The smaller tenacious particles of sputum are best dissolved upon a slide in 10% sodium hydroxide, covered with a cover glass, and examined under a low power lens. The yeasts are easily recognized by their buds and mycelia or their double contour with surrounding



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capsules A Grams stain will reveal that yeasts retain the gentian violet The sputum should be examined in the above manner for several days and the continued presence of yeasts alone is sufficient for establishing a tentative diagnosis Other criteria are also important in that they establish the diagnosis beyond questionable doubt They are as follows

1 Repeated positive cultures with recovery of the same type of yeast

2 Repeated smears showing the continual presence of yeasts in the sputum

3 Blood positive agglutinating tests, 1-20, 1-60 Higher titre very significant

4 Phagocytic index should indicate increased phagocytic ingestibility of yeasts

5 Animal inoculations should prove the yeast to be capable of producing the infection in rabbits

6 Sugar reactions and cultural characteristics of the organisms should conform to types of yeast pathogens now recognized as disease producers

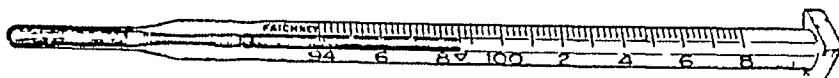
Treatment As stated before, a careful physical examination of the patient should be made and it is of great importance to exclude tuberculosis and other wasting diseases such as malignancy and metabolic maladies It now becomes important to see that the patient is first given fluids in considerable quantities in conjunction with alkalies so that acidosis and dehydration may be prevented Constipation, if present, should be corrected and a diet of bland, nourishing, non-acid forming foods should be given For spe-

cific medication potassium iodide in increasing size doses should be administered Sodium iodide given intravenously, grains 5, is of great value If the process is refractory to iodides, it is important to use sterile aqueous gentian violet 0.5% solution each week—6 cubic centimeters in the patient's veins Very few reactions occur from this solution Violet ray is helpful At other times, a yeast vaccine seems to aid in recovery and if the patient has a mixed streptococcic yeast infection a streptococcus vaccine, given prior to or along with the specific treatment, is often productive of excellent therapeutic benefits The chemicals referred to above are specific for yeasts This has been established by the author in a previous report (10) As a rule, patients with pulmonary yeast infection run a chronic course and eventually recover Occasionally death occurs, most often from complicating diseases

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INDICATIONS FOR PNEUMOTHORAX

(Continued from page 11)

a severe intestinal tuberculosis

A mild *cardiac or renal condition* is no contra-indication although a severe one is

Age may be a factor. We do not look with favor on cases over 50 though, to be sure, these are rare. *Early pregnancy or diabetes* are not contra-indications

Pleural adhesions themselves are not contra-indications but may interfere very much with getting a satisfactory collapse. In many of these cases the best we can do is find a pocket and upon the size of the pocket depends the degree of benefit given the patient. This pocket acts the same as the fibroid case—the treatment is only palliative as the adhesions tend to hold open the part you wish to close

I feel *asthma* is a very strong contra-indication unless the asthma can be proven to be of bacterial origin. In these cases a vaccine may work wonders. It is true of course that if the paroxysms can be controlled we eliminate the cause and the patient, under strict observation, may stand the pneumo well

Pneumo on Left Side—Matson believes he gets better results in left-sided cases. He thinks this is due to the fact that in the right-sided case there is pressure on the right heart and superior vena cava

Every man who is doing much artificial pneumothorax work would greatly

rejoice if there were some standard by which we could determine the length of time the lung should be collapsed. It depends on so many factors that it is difficult to decide just when a lung should be allowed to reexpand. We believe, however, the best results are obtained in cases where the lung has been collapsed four or five years. This must be decided by the general condition of the patient. As long as the patient shows any signs of activity—temperature elevation, rapid pulse—I would suggest keeping it collapsed. At the Camp we allow it to reexpand slowly, watching it carefully. There is no reason, of course, why the patient should not return to work after the symptoms of activity have ceased and the resistance is somewhat built up. The physical signs would be of no benefit in making this decision, constitutional symptoms must be the guide

I believe it is essential to watch all pneumothorax cases very closely with the fluoroscope. At the Camp we fluoroscope our patients every week. It is certainly necessary to have the patient under close observation when the treatment is started. It should not be started at home or, if started at home to control a severe hemorrhage, the patient should be moved immediately to a hospital before the next treatment is given

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THE DIAGNOSIS OF INCIPIENT PULMONARY TUBERCULOSIS

(Continued from page 17)

paper that absence of proof is not proof of absence. The fact that the notice comes back to you from the City or State Health Department with the words "Tubercle bacilli were not found in the sputum", means nothing more or less than that in that particular minute particle of microscopic pus or cheesy material which was examined the germs were *not* present. In one of my cases it was only after the fortieth sputum examination that tubercle bacilli were found. This is an important point to remember at all times, that the fact that the sputum is negative does not prove that the patient does not have incipient tuberculosis.

With all this data in the vast majority of cases it should be possible to state fairly accurately whether or not an early tuberculous process is present and a cause of the patient's symptoms but in every case take no chances. If you are in doubt, do not tell the patient or his friends that you cannot make a definite diagnosis or that you cannot find anything wrong but state that there evidently is something wrong but that you cannot tell them exactly what it is and that it is absolutely

necessary to keep the patient under observation until a decision is reached. This is the only way to avoid tragic consequences later on. Finally, although we are dealing here with diagnosis, one word as to treatment. In the vast majority of cases the diagnosis of tuberculosis even in its most incipient stage should mean a stay at a sanatorium for a while at least. The treatment of tuberculosis is to a large extent one of educating the patient and even his friends and relatives. This process of education can be carried on infinitely better in a sanatorium with experts in charge than in the home. In almost every case it pays to talk frankly and openly if not with the patient certainly with some member of his family. Impress upon them the importance of health and how necessary it is to take every precaution not to lose it. But whatever course of treatment you advise remember at all times that it is based upon rest, physical and mental, and remember likewise that success in the treatment as well as in the diagnosis of tuberculosis depends upon dealing with human beings and not with cases.

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Program

FOR THE MEETING OF THE

Federation of American Sanatoria

Convention Headquarters AMBASSADOR HOTEL, KANSAS CITY, MO

MONDAY, MAY 11th.

- 10 00 A M Administrative Meeting
W W Buckingham, M D, Kansas City, Mo, Chairman Committee on Arrangements, Presiding
- Message
William Devitt, M D, Allenwood, Pa, President, Federation of American Sanatoria
- Committee Meetings
- 12 30 P M *Luncheon Meeting, Ambassador Hotel
Max Rothschild, M D, San Francisco, Calif, Chairman
- 2 30 P M Administrative Meeting
William Devitt, M D, Allenwood, Pa, President, Federation of American Sanatoria, Presiding
- Reports of Committees
- Election of Officers
- 7 00 P M Banquet (Installation of Officers), Ambassador Hotel Roof Garden
Note Guest speaker will be announced in the May Issue of Diseases of the Chest

TUESDAY, MAY 12th

- 12 30 P M *Get to Gether Luncheon Meeting, Kansas Citian Hotel
for the Members of the Federation and invited guests (see editorial)
LeRoy S Peters, M D, Albuquerque, N M, Chairman
Orville E Egbert, M D, El Paso, Texas, Secretary

WEDNESDAY, MAY 13th

- 2 00 P M Session on Tuberculosis, A M A Program, Section on Miscellaneous Topics, Scientific Assembly, City Auditorium (see editorial)
James Alexander Miller, M D, New York, N Y, Chairman
Charles Hartwell Cocke, M D, Asheville, N C, Secretary
- 1 Chairman's Address-----James Alexander Miller, M D, New York, N Y
- 2 Pathogenesis of Tuberculosis-----Max Pinner, M D, Oneonta, N Y
- 3 Case Findings Methods for the Diagnosis of Tuberculosis-----
J Burns Amberson, Jr, Bellevue Hospital, New York, N Y
- 4 Sanatorium Care of the Tuberculosis-----
LeRoy S Peters, M D, Albuquerque, N M
- 5 Compression Therapy, Uses and Limitations-----
J J Singer, M D, St Louis, Mo

*Programs for the above luncheon meetings are now being prepared and will be announced in the May Issue of Diseases of the Chest

NOTE: The above is subject to change Consult the May Issue of Diseases of the Chest for a complete program

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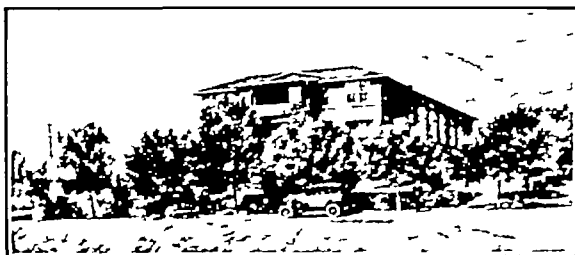
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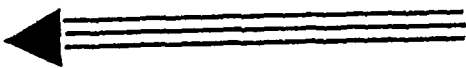
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By Frederick R G Heaf, M.D., and R A C MacNair, M.D., London, England
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By L. Eloesser, M.D., F.A.C.S., San Francisco, Calif
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By I B Ballenger, M.D., Albuquerque, N M
- 5—BILATERAL SIMULTANEOUS PNEUMOTHORAX REPORT OF CASE WITH DISCUSSION
By Harry Golembe, A.B., M D , Liberty, New York
By W A Gekler, M D , F.A.C.P., Albuquerque, N M
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By Robert O Brown M D , Santa Fe, N M
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By Champneys H Holmes, M D , Atlanta, Georgia
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By Don F Catbarr, M D , Atlanta, Georgia
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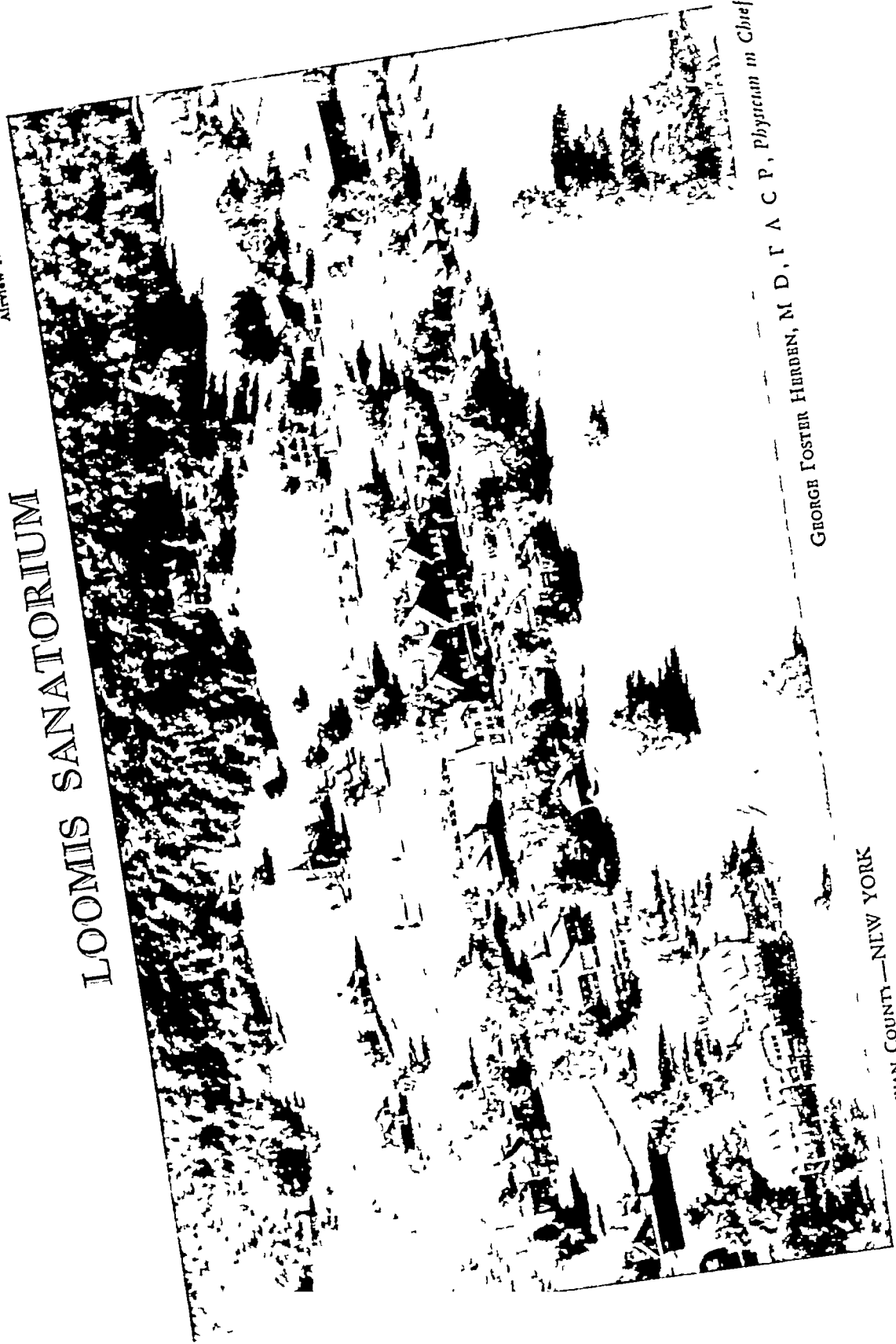
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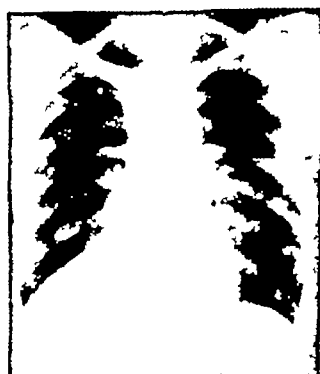
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At left—Plain Roentgenogram

At right—Lipiodol Bronchogram

Photographs courtesy
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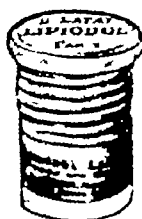
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COMMITTEE ON ECONOMICS FEDERATION OF AMERICAN SANATORIA

(A National Association of Private Sanatoria and Chest Specialists)

COTTON AVENUE AND WYOMING STREET
EL PASO, TEXAS

March 1, 1936

Gentlemen

This is the third of a series of open letters addressed to physicians and officials of industrial and welfare organizations. If you did not read the previous issues, we will be pleased to furnish you with copies upon request.

Welfare organizations exist to provide the means for proper medical and surgical care in time of need. The Committee on Economics of the Federation of American Sanatoria has been organized to place at the disposal of welfare organizations a national service for the proper care and hospitalization at private sanatoria for those members who may be in need of this service.

The private sanatoria, listed below, augmented by recognized chest specialists, have been pioneers in the fight against tuberculosis and thousands of people are to day enjoying good health and happiness because of the treatment and knowledge obtained. Specialized medical and surgical care is an important factor in the treatment of the tuberculous. Permit us to acquaint you with same.

For further information please address the Committee on Economics of the Federation of American Sanatoria at the above address.

Sincerely yours

COMMITTEE ON ECONOMICS
Federation of American Sanatoria

DIRECTORY OF PRIVATE SANATORIA AFFILIATED WITH THE FEDERATION OF AMERICAN SANATORIA

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Santa Fe
St. Vincent Sanatorium
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WASHINGTON

Seattle
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DISEASES OF THE CHEST

Official Organ of the Federation of American Sanatoria
Editorial offices 1018 Mills Building, El Paso, Texas
Business Address Cotton at Wyoming, El Paso, Texas

(A MONTHLY PUBLICATION)

"The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind"

Lawrason Brown, M D

Editorial Comment

Hear Ye! MORE than five hundred comments have been received during the past two months by the editors of DISEASES OF THE CHEST, attesting to the splendid papers, the fine editorials and the educational value of our journal, which is now entering its second year in the field of medical literature. A New York City physician writes, "I find the advertisements of sanatoria as carried in the DISEASES OF THE CHEST informative and valuable." I wish we had the space to quote all of the fine comments sent to us by our readers.

We are grateful for these expressions of opinion and as it is beyond the physical limitations of the present staff of DISEASES OF THE CHEST to answer each of the writers separately, we are taking this opportunity to thank each one of you, through the columns of this journal for writing to us and at the same time extend an open invitation for further comments and for the submittal of any papers on subjects pertaining to chest diseases.

We call your attention to the special subscription offer as noted on the back inside cover of this issue. If you have not already subscribed to the DISEASES OF THE CHEST, we urge you to take advantage of this unusual offer, while the papers listed on page 32 are still available. M R

Sanatoria Status A STARTLING picture of the unfairness of tuberculous hospitalization was outlined in the American Medical Journal of December 7, 1935, by Doctor Frijof Arestad.

Editorial comment in the DISEASES OF THE CHEST was given in the January issue. The importance of the subject certainly warrants a repetition.

Dr Arestad in this survey pointed out that tax supported institutions were caring for part or full pay patients, yet, had a waiting list of over 8,000 patients that were indigent. The private sanatoria were caring for almost 5,000 patients free, about 3,000 part pay and had approximately 4,000 vacant beds.

Private sanatoria through the taxes they pay help to maintain county, municipal and state institutions. These private sanatoria are conducted the same as any other private business or enterprise, they are an absolute necessity in the treatment of tuberculosis and should be accorded the same consideration with the relation to infringement of rights as other private businesses.

Why should patients that are able to pay be permitted treatment in county, municipal and state institutions when these institutions are primarily for indigent cases? When pay patients are hospitalized in these institutions, the rates charged are invariably less than the per capita cost,

and indirectly the taxpayer is supporting a person able to pay and who usually is not asking for charity

Why must such a condition go on? If the pay patients in tax supported institutions were compelled to seek hospitalization in private institutions, it would permit the hospitalization of the indigent patients now on the waiting list and would reduce the tax burden in every community in the United States

The Federation of American Sanatoria does not object to the building of tax supported institutions when needed, but, they do object to over construction in one community and under construction in another with the result that over constructed areas solicit pay patients to keep their beds full

The Doctors who are among the taxpayers of the country should make an effort to prevent such unreasonable and unnecessary expenditure of their money At the same time the Federation of American Sanatoria pledges their support towards the building of tax supported institutions wherever and whenever needed for the care of the indigent tuberculosis patients

L M

Protection of Workmen THE PROTECTION of workmen against dust and its dangers is but one aspect

of the more general problem of protection against all trade dangers The health of workmen in "dusty trades" should be supervised by a physician, especially appointed for this purpose As a rule, such protection cannot be left entirely to the individual employers, for these are often more interested in their profits than in the health of their workmen and frequently they do not, or will not, appreciate the necessity of rendering the work as hygienic as possible On the other hand, workmen are often singularly indifferent to the special dangers of their trades, which they accept as a matter of course Then, too, the idea of personal liberty which has often protected the unscrupulous master or the careless workmen, should give way to a more general conception of the duty of the community to its individual members In the case of the

"dusty trades," individuals with bronchitis, emphysema and asthma, as well as tuberculosis, should never be employed The press, recently, has had a lot to say about silicosis and has attracted a great deal of attention, generally, in the case of "dusty trades" Betterment can be expected only when proper laws for protection of workmen are enacted and enforced Adequate laws will necessarily contain provisions for medical supervision

C M H

The Treatment of Tuberculosis in Children THERE ARE two types of tuberculosis which may be found in children, and the

treatment differs widely according to the type found in the individual case The adult type, in which the parenchyma is involved, is less frequently found than the childhood type in which the involvement is largely confined to the lymph glands about the hiluses, the bronchi, the trachea and the cervical region With the greater precision in diagnosis and the realization of the prevalence of tuberculosis in children, however, more cases of the adult type are being found in children

Treatment of the two types differs materially Where the adult type is found in a child, the treatment which is used in adults should be instituted with perhaps a step further in the matter of rest In other words, in an adult where the amount of involvement and the symptoms of toxemia would indicate that this patient should spend the afternoons in bed, but could be up and on very light exercise in the forenoons, a child with apparently the same extent of involvement should carry out a complete bed rest, possibly allowing bathroom privileges The reasons for this are numerous

1st The child, being in the stage of growth and development, has not built up the natural resistance which an adult should have

2nd For the reason that he is in the stage of development, he needs to conserve and store up more of the food which he takes, and this would not be possible if he uses a portion of his food

to produce the energy required for exercise

3rd The child's nervous mechanism is more delicate and sensitive than is that of the average adult, and since the toxins produced in tuberculosis are excitants to the central nervous system, and exercise increases the production of these toxins, then rest and not exercise is indicated

4th In the very nature of things, the child's exercise differs from that of the average adult in that his movements are quicker, and his exercise as a whole is more vigorous, and he uses more energy in taking it

In addition to this, the fact that the child is developing into youth or manhood, makes it advisable that more care should be given to the selection of his food as to its vitamin content and other qualities. Children require more proteins, and more minerals than do adults of proportionate weight. Such preparations as cod liver oil, haliver oil and viosterol are not only better tolerated than in the adult, but they are more necessary to the child. In other words, the treatment of the child with the adult type of tuberculosis must be very aggressive, and every step be carried out with the greatest precision.

In the childhood type where the infection is confined to the glands, it is our custom to be much more liberal in the matter of exercise. In this type, too, however, the amount of exercise must be governed by the symptoms of toxemia and the individual characteristics of the child. If he is of the placid, even-tempered type he may be allowed to attend school with safety, provided that his behavior on the play-ground is supervised in that he is not permitted to indulge in exercise which is very strenuous such as playing basket ball or football. Special care, too, should be given to the diet of such a child, very much as in the one with the adult type.

A child of this type may be treated very much as the other children of the family, with the exceptions noted above. It is not necessary to make an invalid out of him by enforcing bed rest, but he should be required to retire early at night, to eat

regularly, and to have the proper kind of food.

The matter of exercise and rest must be varied according to the extent of involvement in the glands, the type of child with which we are dealing, and the severity of toxic symptoms, but in all cases we can be more liberal with the child having the childhood type than the one with the adult type.

Since Iodine seems to have a special alterative effect upon lymph glands, it is our custom to administer it in some form to children with the glandular type of tuberculosis, in addition to the small amount derived from the cod liver oil the child may be taking.

After all, the child with the childhood or glandular type should have such details of treatment carried out as seems in the judgment of the physician best suited to the individual case, bearing in mind that, since the lung itself is not involved, the necessity for rest is not so great.

R B H SR.

Tuberculosis Program WE ARE PLEASED to announce that the "Session on Tuberculosis" to be held in the Section on Miscellaneous Topics of the American Medical Association meeting will take place on Wednesday afternoon, May 13th at Kansas City, Missouri.

Dr James Alexander Miller, New York City, chairman and Dr Charles Hartwell Cocke, Asheville, North Carolina, secretary are in charge of the program.

This "Session on Tuberculosis" is a new addition to the regular program of the American Medical Association annual meetings and is looked forward to with a keen interest. It is the hope of the Federation of American Sanatoria, that a "Section on Chest Diseases" be established as a regular feature of the American Medical Association meetings.

The committee is arranging an instructive and interesting program, so make a note of the date, Wednesday, May 13th, and remember that all roads lead to Kansas City from May 11th to 15th. It is going to be a fine meeting—and we'll be looking for you.

M K

The Proper Use of Rest

WHEN DR THOREN asked for suggestions as to what should be discussed at this meeting, I told her

I thought the whole program of such a meeting could be very profitably devoted to the consideration of what we mean by rest for a tuberculous patient, or words to that effect. In reply, Dr Thoren asked me to discuss briefly sanatorium regulations and enforcement of rest, passes, smoking, etc., and penalties, if any. I am going to digress from that subject because I want to talk, even if I have time to touch only a few of the high spots, about what I had in mind when I made the suggestion to Dr Thoren. And that was this:

Although rest is still universally recognized as the fundamental in the treatment of tuberculosis and this idea is continually reiterated and emphasized in the literature, yet I believe there is not a single one of us here who does not constantly see patients, who have been treated in and out of sanatoria, whose chances to regain their health have been thrown away, obviously because they have not been properly advised or taught to rest. Again, the proper use of rest in the early stages of pulmonary tuberculosis would not only restore a much larger percentage of patients to normal health, but it would greatly reduce the number of patients who today must necessarily be submitted to surgery, in varying extents, in an endeavor to save their lives—lives which, if saved, are permanently handicapped.

It is not only men in general practice, but, in many cases, chest men as well, who are responsible for these tragedies. I am well aware that in many of these cases the physician is not to blame, but often, and all too often, he is to blame. There are a number of tuberculosis sanatoria today, both private and public institutions, where the atmosphere is more

BY
E W HAYES, M D
Monrovia, California

that of a resort hotel than a place for persons suffering with tuberculosis. And many patients with progressive tuberculosis, outside sanatoria, are going about making frequent visits to their physicians' offices for treatment, the majority of whom are walking directly into their graves. So it is my feeling that the California Sanatorium Association could render an excellent service if it would face the issue and, by recognizing its shortcomings, conduct a strenuous campaign for the use of rest in the treatment of tuberculosis as we know it should be used.

By the term rest in the treatment of pulmonary tuberculosis is meant that the patient should be in bed, with one pillow, twenty four hours out of each day and seven days out of each week, mentally, emotionally and physically relaxed. He should deviate from this regimen only when directed by his physician, who should know and be in close touch with his mental, emotional and physical conditions.

It is true that a few patients will get well almost in spite of what they do or are let do, and a few others, even of the early cases, will not recover regardless of what they do. On the other hand, it is also true that the great majority of patients suffering from tuberculosis are eventually cured by attention to details. At the outset, none of us have any way of knowing which of these patients is which. Consequently, we should begin cautiously with them all and only as we are able to accurately visualize the underlying pathology and are then reasonably sure of our ground should we permit the dissipation of energy by exertions.

As physicians, we have no right, in any sense of the word, to gamble with the lives of our patients by taking a chance through following the path of least resistance. We certainly would not want it to be done with members of our families, and every patient is a member of some

*Read before the California branch of the American Sanatorium Association, Livermore, California, November 12, 1935.

family. Sitting up in bed for meals or going to the bathroom even once a day may be just enough to turn the tide in the wrong direction and this, in patients who outwardly may not appear to be extremely sick.

One of the excuses offered for the lack of proper control of patients from the standpoint of rest is that there are a large number of patients who will not heed the admonition to rest. Anyone who has had extensive experiences and who has really tried knows that the proportion of this class of patients is really very small.

Other excuses offered are that many of the public sanatoria are not able to sufficiently staff their institutions to carry out the desired rest program and that these same public institutions are not allowed to keep their patients a sufficient length of time to give them the prolonged rest period they need. There are no doubt grounds for these last two excuses in a number of instances, but it is a sad reflection on these institutions and the work they are doing, for, in reality, they are not getting anywhere, generally speaking. By rotating their patients without giving them sufficient time to reasonably safeguard their future health, they are, for the most part, simply going around in a circle and, while they may be able to secure some cures, from the standpoint of health and from the standpoint of economics, they are failures as far as the treatment of tuberculosis is concerned.

In regard to passes for patients, I do not issue them. I do not believe in them because I have never found them necessary in my private work or in my connection with public institutions. They certainly do not impress the patient with the fact that he should carry out the rest cure with serious attention to details. We cannot blame the patient who is issued a pass for a day each month or for a longer period every few months for feeling that if the doctor believes it all right for him to carouse for that length of time periodically there is no reason why he should not do some carousing between times. It has been aptly said that a pa-

tient may, and often does, undo in ten minutes all he has accomplished in six months.

In regard to smoking, I think we all pretty generally agree that it is harmful to well people, and I say this in spite of the fact that I began to smoke over forty years ago and still smoke. I did not smoke on the cure. In moderation it may not be harmful, but how many smokers use moderation? What is moderation for one may be excessive for his neighbor. Generally speaking, smoking interferes with the appetite and the assimilation of food. It is an irritant to the respiratory tract and tends to increase the cough. It has been my experience that very few patients, if properly approached, can not and will not give up smoking. Finally, smoking on the part of the patient is not in accordance with the spirit that the patient must make sacrifices and follow a rigid regimen.

In regard to penalties, if there is the right setup in the institution and the right atmosphere, the patient who is inclined to violate the regimen mapped out for him, soon finds that he is very unpopular with the other patients and this, in itself, I think, is the most effective penalty. In the Orange County Hospital we try to keep a room or two in an isolated building where we send the occasional uncooperative patient. There he has a chance to think things over and, in a short period, he is usually willing to return to the ward and be good.

The enforcement of rest or any other phase of the cure should be attained primarily by gaining the patient's confidence and making him feel that you are his friend. At the outset, tell him the truth about his condition, as far as you know it, about what he has to do, where he must do it and how he must do it. It is uncertainties that, for the most part, make the patients worry and make them restless. You can always be optimistic about tuberculosis, for it is the most curable of chronic diseases if properly handled. The number of patients that justify giving a hopeless prognosis when first seen is very small. Let the patient under-

(Continued to page 28)

The Tragedy of the Contra-Lateral Lung

IT HAS been the experience of all Psthisologists, I am sure, to have seen their brilliant therapeutic

BY
CHAMPNEYS H HOLMES, M D
Atlanta, Georgia

efforts—the successful collapse by pneumothorax of a diseased lung, the closure of a cavity by an intra-pleural pneumolysis, the satisfactory diaphragmatic rise and compression from a phrenic paralysis, a well performed apicolysis, or a nicely executed thoracoplasty—thwarted, their rose-colored prognostication beclouded, if not completely reversed, and the very life of the patient on the verge of a triumphant emergence, jeopardized or doomed, by the advent of disastrous trouble in the opposite lung. Therein lies the tragedy and therein the sum and substance of this article. The unfortunate and disappointing experiences, just summarized, have so often been the author's that he finds it necessary, in discussing with the patient or his family some contemplated procedure, to include the inevitable "if." The directional finger of this "if" points steadily towards the opposite or contralateral lung. It would be well and wise for the physician to always make this proviso and thus obviate what otherwise may prove an unpleasant disappointment for him and a bit of disillusionment or grief for the patient.

This directional finger of uncertainty is pointed at the contra-lateral lung exclusively, of course, only when the collapse procedure or procedures on the original side have been consummated with the anticipated results. The tragedy of my discussion is predicated upon this fact. An unclosed cavity or an unchecked exudative process may by contigal or bronchogenic spread lead to overwhelming infection in one or both lungs. However, unfortunate this balk to our therapeutic efforts may be, to the competent observer, there is little of the element of surprise or bitterness of disappointment here, for to him the grave potentialities of such pulmonary

mischievousness is well known. The more I see of this disease, its workings, its evolution, the more I hold

in dread and entertain an awesome respect for the open cavity.

The battle cry on the Tuberculosis front, or the slogan for a National Campaign could appropriately be "Close That Cavity", proclaimed if you will, to the cadence of those lusty shouts from the guidon—"Stop That Touch-Down", "Hold 'Em Princeton", etc.

Our disappointment is most keen in those cases where a formidable disease process has been brought under control, and perhaps rather brilliantly, by one of the collapse procedures mentioned above, and then unheralded and many times with dramatic suddenness there appears an acute spread in the contra-lateral lung. This is particularly true when the contra-lateral lung was shown by all the means at our command to be free of disease, when the therapeutic procedures were on the original side. The presence of an already existing lesion in the "good" lung, imposes the physician in charge the necessity of exercising sound judgment and meticulous caution. The latter can accrue only from a wide experience and a basic intelligence. To overlook the presence of a contralateral lesion and the failure to subsequently evaluate its potentialities cannot, of course, be condoned. Suffice to say, that occasionally in the fervor of organizing the attack against an extensive disease in a lung, it happens. The aggravation and at times, devastating spread of this lesion, may follow the application of unwise, perhaps too radical, collapse measures upon the diseased side. Perhaps it would have been better to have temporarily interrupted the phrenic nerve than to have performed the permanent paralysis, perhaps a phrenic neurectomy would have been more wise than the pneumothorax or thoracoplasty that was done, and perhaps the

selective low-tension pneumothorax would have proved effective and safer than the complete compression type. The proper selection of the collapse methods may spell the difference of success and gratification on one hand, and on the other, failure and tragedy.

When a lung is collapsed, partially or totally, there is imposed an added burden of function—proportionately greater in the total collapse—upon its opposite fellow. Parenthetically speaking, in giving the masculine gender to the lungs, the only justification I can think of is that elsewhere in this discussion on lungs I made a reference stamped with a masculine motif namely, "foot ball." The opposite fellow, then, has to carry in a great part the respiratory load. It is obvious, therefore, that the integrity of this lung could be definitely and decidedly threatened did it contain a diseased process. There again, paradoxical as it may at first appear but common to the experience to all engaged in collapse therapy, the contra-lateral disease may show marked improvement. The explanation of this welcomed phenomenon probably lies in these facts. When the more diseased lung is collapsed, it is shunted out of circulation, the toxemia reduced and a raising of the body resistance follows. Also, there is exerted a counter pressure via the mediastinum to the contra-lateral lung. This counter pressure may, and often does, effect a beneficial response as is occasioned by the pressure on the original side.

With the advent and during the following earlier days of pneumothorax treatments, a minimal lesion in the contra-lateral lung was considered the limit of safety. Anything more than this portended grave danger and contra-indicated the method.

A perfectly clear lung was greatly preferred. To-day with a wider and richer experience, with the more frequent observation of the phenomenon of improvement just described, with the application of low tension selective collapse and perhaps with all augmented by a bolder attitude, con-

siderably more liberties are being taken. In the consideration of the proposed collapse procedures for the badly affected lung, just how little or how much will the contra-lateral lung stand, just how slight or extensive a pathological involvement will it permit? To answer these questions is frequently quite difficult and the solution of the problems raised, demands experience, judgment and intelligence. Even then, only too often, failure proves the error. There, solution likewise permits a little generalization, but should be applied rather strictly to the individual case.

Such factors as a general resistance of the patient, the age, and his or her mental attitude, are paramount in this connection. If the writer may be privileged one generalization, it is this. I lay some stress upon the question of moisture in a given lesion. Everything else being equal, I would prefer taking my chances with a large lesion stethoscopically dry than with a smaller one, stethoscopically wet.

It is quite understandable how an unchecked soft process or an open cavity can, by bronchogenic spread, involve the contra-lateral lung and it is equally obvious how disease in this contra-lateral lung may be fanned into a consuming flame. It is more obscure or puzzling when an apparently perfectly performed collapse is followed after a short or longer interval by the tragic occurrence of an acute flare in the previously normal opposite lung. There may be several reasons for this, some of them in our present state of knowledge, we do not as yet know. Most assuredly in many instances, within the interior of what appears by all methods of physical and radiographic examination to be a perfectly collapsed lung, there exists open cavities and sinuses communicating with thick walled bronchi—and thusly to the opposite lung. The post-mortem is ample proof of this. Very likely an allergic state is manifest in the contra-lateral lung, causing it to be receptive to indigenous and to continued or additional exogenous infection.

(Continued to page 30)

Tuberculosis and Bronchiectasis

THERE has been a widespread belief that Pulmonary Tuberculosis and Bronchiectasis do not occur

in the same patient. Since iodized oil has been introduced into the bronchial tubes, we have been able to demonstrate definite bronchiectatic dilatations of both the cylindroid and sacculated types in the basal bronchial tree along with tuberculosis. In a great many of these patients there are definite pulmonary changes both in the upper and lower lobes, there may be cavitation, and positive sputum for tubercle bacilli may be present.

The bronchiectasis may be only mild or may be severe. In the mild cases we find the patient having a persistent morning cough with variable amounts of expectoration. As the sputum or cough increases the patient believes he has increased cold and as the sputum subsides the patient believes he is again getting over this cold. This cycle reaction occurs almost regularly and improvement takes place as the tuberculous condition improves but the cough does not disappear entirely in the majority of these cases.

Bronchiectatic cases with pulmonary tuberculosis may occur as a result of the occupation of the individual. Those that are employed in occupations where irritating substances may have been introduced in the lungs from time to time, the irritation will produce changes in the bronchial tree that results in dilatation.

Some bronchiectatic cases appear to be due to an upper respiratory infection, such as bad sinuses, teeth or tonsils. When the bronchiectatic condition has become severe the removal of the primary focus usually does not improve or change the patient's condition.

When fibrous tissue develops in or about the hilus areas producing constriction in the hilus and obstructing the main stem bronchi to the base, bronchiectatic changes may occur and remain permanent. Symptoms of an asthmatic nature are usually

BY

LOUIS MARK, M.D., F.A.C.P.

Columbus, Ohio

present and are difficult to control.

Knowing that tuberculosis and bronchiectasis can

occur in the same individual and that in many patients the evidence of these bronchial changes is noticeable early, it is essential that an effort be made to prevent the increase of the bronchiectatic disease in order to avoid having the patient arrest the tuberculous disease yet leaving a permanent cough and expectoration. When a patient's cough is out of proportion to the amount of changes found on the examination and x-ray, one should try to find whether bronchiectatic changes are taking place. This can best be accomplished by the introduction of Lipiodol into the bronchial tubes and an x-ray taken. If you find the bronchial tree of greater dimension than normal or wider at the tip than it is near the hilus, it is fairly positive evidence that bronchiectatic dilatation is occurring.

Introduction of Lipiodol in the majority of patients is quite simple. It is always wise to paint the throat with a local anesthetic to reduce or eliminate the cough and swallowing reflexes and by carefully instructing the patient to breathe through the mouth, avoid swallowing or coughing. Warming the Lipiodol sufficiently to make it flow freely, and drop it on the back of the tongue in a fairly steady stream, the oil will gravitate into the trachea and bronchi with ease and then by rotating the patient in various positions all parts of the lower lungs can be filled so that a clear outline of the bronchial tree can be seen. The amount of iodized oil that is necessary will vary from 5 to 20 cc. Iodized oil should not be used in patients who have recently expectorated blood.

Lipiodol has proven unusually successful both for diagnosis and treatment. We do not know the exact nature of its action but it seems to reduce the amount of cough and sputum, changes the type of sputum

(Continued to page 30)

Putrid Lung Abscess

MOST SURGEONS classify this type of lung abscess and gangrene together for diagnosis and treatment

BY
FELIX P. MILLER, M.D., F.A.C.S.
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Probably there is no sharp distinction to be made. However, we are inclined to associate the gangrenous case with acute, fulminating conditions, where large areas or the entire lobe is necrotic, and we diagnose those more localized areas of pus surrounded by pneumonitis, as abscesses. A change in the organism may convert the abscess into a gangrenous condition.

Putrid lung abscess is definitely a clinical and pathological entity. It is produced and maintained by pathogenic anaerobes and is bronchogenic in origin.

Putrid lung abscesses are due to aspiration of infected material. In my most recent case, which will be more fully described later in this paper, the abscess was apparently due to a blade of caterpillar grass, which went into the smaller bronchial tubes of the right lung, and was located near the site of the operation, too deep to be reached or seen by bronchoscopic examination. This was coughed up, after the patient left the hospital, and was easily recognizable, the only change in the piece of grass being the loss of a few of the bristles.

Bacteriologically, most frequently the *Aspergillus* or a mixture of Vincent's and other anaerobes are found. The musty, foul odor of the sputum is due to the action of these organisms.

In my experience, these lesions are nearly always situated near the surface of the lung, and early produce a pronounced reaction in the overlying pleura. This cavity contains foul detritus and liquefying sloughs of the lung. The cavity remains filled with this class of material, and seldom shows a fluid level in the acute and sub-acute stages. The bronchial drainage is simply an overflow of this material crowded through the pneumonitis and plugged bronchial tubes, producing, of course, irritative bronchitis, manifesting

itself in cough and foul sputum.

I have never found a putrid lung abscess more

than six centimeters from the pleural wall.

Dr. Frederic T. Lord, of Boston, states, calling attention to the usual peripheral site of the lung abscesses, "proximity to the pleura is in general a striking feature of the cases coming to autopsy in the Massachusetts General Hospital."

The infected material containing the anaerobes, such as the *Aspergillus Niger*, is carried down into the small bronchioles of the fourth or fifth diameter, where a stenosis of the bronchus results in the production of an infection that ulcerates through the bronchus and into the lung, where it sets up a small, parenchymatous lung abscess.

Hemorrhage is an early symptom, and is the result of the ulcerating extension into the blood vessels. Frequently, no cause can be demonstrated for the hemoptysis. Some authorities say that hemorrhage in a putrid lung abscess is more frequent than it is in early tuberculosis. The typical putrid lung abscesses coming under my observation confirm the finding of hemorrhage as an early symptom.

The course of the disease depends largely upon the degree of bronchial drainage. The extension of the abscess by necrosis makes the abscess irregular in outline. These so-called multilocular abscesses are surrounded by fibrotic tissue.

Clubbing of the fingers and toes, as in other chronic suppurative lesions of the lung, is a curious complication of this disease. This phenomenon does not show any enlargement of the bones. In the chronic cases, there may be a hyperplastic periostitis as a late complication of any type of pulmonary suppuration.

When amyloid degeneration is found, it simply denotes the chronicity and severity of the lesion.

As the fibrosis increases, more or less severe bronchiectasis develops. This con-

dition can be seen in the case that I am reporting, after the pneumonitis has subsided and the abscess is quiescent. Of course, it can only be shown by Lipiodol injections.

The extension of the gangrenous process may perforate the pleura and result in an empyema. In the pus thus formed, the anaerobic bacteria may produce gas, which will show in the x-ray picture as an empyema with partial pneumothorax.

The most striking clinical feature of putrid lung abscess is the violent coughing, with a large amount of foul sputum. The cough continues violently, even though sedatives are given. The sputum is frequently streaked with blood. The odor of the sputum increases if allowed to remain in a vessel. However, the odor is variable, if extremely foul, it is indicative of putrefaction, and is described as pulmonary gangrene.

Due to the close proximity of the pleura, pain is frequently a symptom.

The fever is not constant. The patient usually shows an afternoon rise. As new areas of lung tissue are invaded, a septic type of temperature, with morning remissions and high elevations in the evening, may develop.

After four or five months with free drainage, the abscess wall with fluid level can be detected with the x-ray and on physical examination, however, the full extent of the cavity is rarely indicated. Prior to that time, fluid level and evidences of cavity can rarely be discovered.

The physical signs in cases of putrid lung abscess and gangrene are not distinctive. It is common knowledge that small cavities are frequently overlooked by methods of ordinary physical examination. Of course, bubbling and metallic rales may be heard. The x-ray appearance and the physical signs may be more easily determined immediately following postural drainage than in any other manner. The bronchoscope can seldom locate this type of foreign body, because it is situated in the periphery of the lung, in the small bronchial tubes, which are inaccessible to this instrument. It is of value in exclud-

ing foreign body in the large bronchus, and has been of therapeutic value in promoting drainage.

Intratracheal Lipiodol injections are not of direct diagnostic value, because, the bronchioles being blocked with necrotic material, the Lipiodol does not enter the purulent lung abscess. However, they are of indirect value, in showing the extent and location of the abscess, when they show the patent bronchioles beyond the area of pneumonitis.

Most men state that putrid lung abscess is potentially a surgical lesion from the outset. However, I believe that it is best not to operate in the early acute conditions, as the cavities are certainly more difficult to find, the pleura is not strong enough to allow extensive aspiration without danger to the remaining portion of the pleura. However, to wait until the fluid level can be determined carries a higher mortality, as amyloid degeneration will begin at this time.

Pneumothorax is too dangerous, and a dubious procedure, because of the danger of tear through the pleural adhesions, thus causing a fatal empyema.

Phrenic avulsion has been of assistance before operation, in stabilizing the lung at the time of operation and during treatment. The lung after operation is smaller in size than normal, therefore diminished capacity of chest by paralysis of the diaphragm is indicated, in order to equalize this atrophy of the lung, and prevent tension when the lung is fairly expanded.

In cases where we have a mixed infection, including the Vincent's organisms, I have found Stovarsol, given several times a day, has had a beneficial effect in destroying this type of infection. Intravenous injections of Sodium Iodide have also been used with good results. The literature shows that some men prefer Neoarsphenamine.

In the early acute abscesses, it has been my practice to give the patients postural drainage, and use Stovarsol when indicated, according to the organism. By the use of the bronchoscope and by x-rays, both anterior-posterior and lateral, I en-

deavor to determine accurately the location of the abscess. If the abscess is near the periphery of the lung or the center of the lung, and I think it can be opened through the chest wall, I do so, first making sure that the pleura is attached. If the pleura is not attached, it requires a two-stage operation.

Recently, I have been using a rubber bag which is inserted under the ribs and inflated over the abscess, extrapleurally—in order to insure the formation of adhesions between the parietal and visceral pleura. I prefer this method to packing with gauze or with dental rubber dam. After eight or ten days, if the pressure is sufficient, the pleura will become adherent. I then remove the bag packing, insert an aspirating needle into the cavity and then enter with the electric cautery, burning my way around the needle into the abscess cavity. Drains are then inserted in the usual manner.

I have never had lung bleeding or a secondary hemorrhage since using the cautery and ligating the intercostal blood vessels. Post-operative pain is diminished by destruction of the intercostal nerves. Covering the edges of the ribs with redundant muscle has prevented osteomyelitis of the ribs in all my cases.

Case Report

Because of the extreme importance of a complete clinical history, I wish to give you a report on my most recent case, which, due to the etiology, the type of infection, the classical symptomatology and progress, the extent of the abscess and the end results, I consider one of the most interesting I have ever handled.

W. G., age 16, white. He began having hemorrhages which were thought to come from his throat. He was in good physical condition. He had a slight, hacking cough. Hemorrhages varied from a teaspoonful to half a cupful. He states he had no constitutional symptoms, and, in fact, gained in weight. The parents were fearful of pulmonary tuberculosis, but physical examination and x-rays did not bear out this

diagnosis. A bronchoscopic examination did not reveal any foreign body, and the source of the hemorrhage was not found. Pain appeared in the right side of his chest after the illness had been present for two months. As the symptoms were not relieved, bronchoscopic examination was repeated two or three times. Following the last bronchoscopic examination, the hemorrhage was profuse. *Aspergillus Niger* was found in the sputum. Constitutional symptoms were present—pain, with tenderness in the right side of the chest, was more pronounced. His physician reports that physical examination was not sufficient to explain the hemorrhage. He was put to bed, and in a few days had a hard chill and a high fever. The x-rays now began to show increased density in the right lung opposite the 7th and 8th interspaces and near the axillary line.

He was acutely ill. The amount of sputum increased markedly, the cough was excessive, he began to lose rapidly in weight, and blood transfusions were given. The pneumonitis increased, and an abscess was considered. Later, the increased pneumonitis and pleuritis led to the belief that possibly fluid had formed, and the side was tapped, but no fluid was found. The patient was placed in my care about two years after onset.

The past history revealed that his tonsils were removed at four years of age, under ether anesthesia, but no untoward symptoms had developed following tonsillectomy. There had been no extraction of teeth or other operation that might have produced a hematogenous infection.

At this time, the patient recalled that he had swallowed a piece of grass, which he described as "caterpillar grass." He had some cough at the time, but had no idea that this foreign body might be the cause of his trouble. However, the hemorrhages followed this accident.

His nutrition was poor, he had no appetite. He had lost in weight from 167 to 100 lbs. The cough was almost constant, and the amount of sputum in 24 hours was about 300 ccs, with a foul odor. The skin

on the right side of the mouth was irritated and showed excoriation. The throat was a distinct turkey red.

Chest The percussion note was slightly dull in the scapular line, as far as the anterior axillary line, right lung. Dullness extended to the back and front, on the right side of the sternum, above the liver. The left side was essentially negative. Right auscultation showed diminished vesicular breathing on the posterior surface, axillary surface, and to the nipple line on the anterior surface. In this area, bronchial breathing was increased. From the fourth to the eighth rib in the axillary line, normal breath sounds were not heard. There were areas in which no sounds were audible. Bronchial breathing, large rales with clicks and rhonchi were heard. No cavernous breathing or sonorous sounds were heard. There was tenderness on pressure in the posterior axillary line opposite the 5th, 6th and 7th interspaces.

Heart There were no murmurs. The size and position of the heart were within normal limits.

X-rays made with patient propped up in bed failed to show abscess cavity. The films resembled an unresolved pneumonia, with thick pleura. The working diagnosis was putrid abscess of the right lung, in the midaxillary line opposite the 6th interspace. He rebelled against postural drainage, stating that it had been tried, and he was too weak and sick to attempt it again. The patient was taking H M C No. 2, every three hours, for the relief of cough, pain, and to produce sleep.

Under Novocaine local anesthesia, the right phrenic nerve was cut. The operating room table was placed in a marked Trendelenburg position, patient rolled on his side, and postural drainage was accomplished. About 400 ccs of foul bloody sputum was raised by the patient. He was at once transported to the x-ray room, where anterior-posterior and lateral x-rays were made. As a result, the shadow of an apparently small abscess about the 7th interspace was located, but without fluid level. With the patient still in the

Trendelenburg position, amphoric and cavernous breathing, with large, moist rales, could be heard.

During the next five days, he had some relief, but morphine was used as before. The amount of sputum began to increase but the character remained the same.

The morning of the fifth day, under H M C and nerve block with Novocaine, an incision was made in the axillary line over the 7th rib. Portions of the 6th and 7th ribs were removed. Resection of intercostal muscles and nerves, ligation of intercostal blood vessels, and covering of the raw edges of the ribs with intercostal muscle (as outlined previously) were carried out. A large aspirating needle was inserted in the general direction of the cavity outline. A flow of gas was encountered, and it had a very foul odor. In a short time, a large amount of putrid, disintegrated lung tissue was aspirated. In all, 750 ccs of this material was obtained. The needle was left in situ, and a portion of the parietal and adherent pleura and lung tissue, about an inch in diameter, was removed with the cautery. There was no hemorrhage. Cough, which had been incessant in spite of sedatives and anesthesia, ceased. A McCarthy Endoscope was inserted through the opening, and the large, irregular, multilocular cavity was carefully examined. Part of it had perfectly smooth walls and other portions showed necrotic material, which was removed. Plainly visible through the Endoscope were many small bronchial tubes, plugged with this necrotic material.

The x-rays and physical signs had given no adequate conception of the full extent of the cavity.

Into this cavity, a free flow of oxygen was passed for about five minutes. A large rubber tube was inserted, and fastened to the skin and muscles of the wound.

The patient returned to bed in good condition. He remained free of cough. Oxygen was passed through the drainage tube several times daily. Morphine was discontinued at the end of three or four days. The amount of discharge was seldom over

(Continued to page 28)

The Danger of Tuberculous Infection From Migratory Consumptives

AMONG the social causes responsible for the spread of tuberculosis must be included the migratory habits

BY
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of many men and women suffering from pulmonary forms of the disease. A considerable number of these temporarily inhabit one or more rooms in our health resorts. Very many of these patients are comparatively poor, sometimes subsisting only on a small pension. Frequently they are sufferers from pulmonary tuberculosis in a very chronic form. They reside in private houses that have apartments to let. The danger from this poorer class of visitor applies particularly to health resorts and seaside towns, and is one of the penalties they pay for their attractiveness. These cases have often left London and other large centres on account of their health, they do not consult a doctor, if they can possibly help it, in the fresh locality to which they go to live, and therefore they are not notified and are under no restrictions whatever. They can live in apartments near the sea very cheaply during the off-season provided they leave them when the season commences. Unfortunately there are landlords ready to welcome them, and who do not mean to spend either in money or labour more than they can help on the rooms they let. Scrupulous cleanliness with such is at a discount, and no regard is given to disinfection. Consequently when the tuberculosis tenant leaves these rooms they most certainly would not be disinfected, and they would probably be very imperfectly washed and cleansed. Sometimes the landlord lets for some months to the same tenant, and then during the season to a succession of visitors. In the latter case the blankets oftentimes are not changed frequently. It is quite a common practice to run the sheets through

a mangle to give them the appearance of not having been used.

The rooms used by a tuberculous subject may then be inhabited by a person with lowered bodily resistance, visiting the sea to recuperate after some depressing illness such as influenza, or the apartments may be taken for a delicate child who passes part of its time playing with its toys on the floor, where the infected dust accumulates. It seems morally certain that numbers of people date their infection from surroundings such as these. Tuberculosis Care Committees, where they exist, sometimes come in touch with these tuberculous cases either through their official or voluntary visitors who are working among the poor, or by the patients themselves becoming known on account of financial distress, and then applying to the Committee for help.

Control over tuberculous visitors is always irregular, uncertain, fortuitous, and only a very limited percentage of them are heard of or controlled at all. The following are some typical cases that have been on our lists, and thus they and their dwellings have come under observation.

1. An ex-service man of early middle life, with 100 per cent pension on account of tuberculosis, was living alone in a small, dirty room overcrowded with furniture and hangings. He occupied much of his time in knitting soft woolly wraps, which he raffled at Christmas time. Delicate people probably bought them to wind round their necks and mouths in cold weather. They seemed specially adapted for inhaling the tuberculosis germs with which he, no doubt, infected them. A child recently developed tuberculosis in the same house.

2. A middle-aged single man suffering from chronic pulmonary tuberculosis was almost a mentally deficient. He had no relations or friends to look after him.

* Vice-President of the Hastings and St. Leonards Tuberculosis Care Committee.

1. *British Journal of Tuberculosis*.

and was inhabiting a single room by the sea which he would be obliged to leave as soon as the season commenced. He would certainly be most unlikely to carry out properly any disinfection of his sputum, or adequate cleansing of his sputum flask. Indeed, he probably did not realize his responsibility to others.

3 A poor woman with chronic tuberculosis and living alone was inhabiting two rooms and expectorating very freely sputum containing tubercle bacilli. She told me she never took a flask with her when she went out, saying "Women never do, they haven't the pocket to put them in, I always spit down the drains."

4 Two sisters, both suffering from pulmonary tuberculosis, lived together in two rooms in a poor cottage. They had been receiving visits from members of our Committee for some time, when a visitor, on calling, was surprised to find them gone. They had left the town without telling us of their intentions, but before doing so we learned that they had sold their belongings, consisting of dirty and dusty furniture, carpets, and hangings, to a second-hand dealer. Old infected articles of this description must be a not infrequent means whereby the germs of tuberculosis are carried into the houses of the poor.

To try and prevent tuberculous infection by such agencies as the above, I would venture to offer for consideration the following statements and suggestions.

1 In seeking means for the prevention and arrest of tuberculosis, I think it will be generally admitted as an obvious truism that measures for the control and disinfection of the tuberculous sputum is of the utmost importance, and that the first thing to do is to agree as to the guiding principles of action by which this can best be accomplished.

2 The tuberculous patient must be under supervision as long as he or she is at large. This applies more particularly to those who are deficient (*a*) in education, (*b*) in a sense of moral responsibility. Dr. Marcus Paterson, at a tuberculosis conference, expressed the opinion

that a tuberculous patient who set all rule and authority at defiance was more dangerous to the community if uncontrolled than a lunatic. It was a remark that struck me forcibly at the time, and now with a greater experience I most emphatically endorse it.

3 It is advisable to perfect our system of notification. Health Authorities should notify one another whenever possible regarding the movements of tuberculous patients, so that a Medical Officer of Health may know the address of every consumptive arriving in his locality. I am here referring more especially to a circular issued by the Ministry of Health. Under the heading "The Keeping of the Register," appears the following note: "In County Areas the Minister has no doubt that County Councils and Tuberculosis Joint Committees will be prepared to arrange for their Tuberculosis Officer to communicate such information to the District Medical Officer of Health as well as any information which may be in the possession of the Tuberculosis Medical Officer as to deaths or removals from the *district of persons who have been under supervision*, whether or not accompanied by domiciliary or other active treatment under the Tuberculosis Scheme." I would also direct attention to the remark in the next paragraph on "information from other sources" (The italics are my own).

4 That the *onus* of notification should rest upon the patient, him or herself, so that when a tuberculous adult who has been certified as suffering from pulmonary tuberculosis goes to live in a fresh locality, it should be his or her legal duty to notify it to the right authority. This is my main contention, and I am perfectly aware that it is a proposition that would give rise to protest from a section of the public. It is a case where sentiment may easily overrule judgment. As bearing on the matter as viewed from the legal aspect, I would refer to the well-known Collins-Hopkins case, which dealt with (to quote the newspaper headlines) "A Tenant's Right to leave Infectious Houses"

and to provide "The Seeds of Death in Furniture" *The London Times* in a leading article on this case comments under the heading "Health Conscience" thus "It is one of the oldest principles of social life that the calamity of an infectious illness imposes on the victim the duty of taking such measures as may be within their power to protect others from danger"

When notified (by whatever means) and registered, every consumptive should be visited by the Medical Officer of Health or a skilled tuberculosis visitor. All tuberculous cases and their surroundings should be under control. The tuberculosis Care Committee can help these sufferers when necessary, and their rooms would be disinfected when vacated. The necessity for stripping and repairing the walls of a room occupied by a consumptive may be learned from an article on "The Sanitation of Wall-Papers," which appeared in the April number of *Health*.

5 I would suggest that a still further advance would be to develop the principle of segregation. It would be enormously to the advantage of the patient as well as

the public if cases similar to those I have described could live in houses or hostels especially adapted to their needs. For the price they pay for non-hygienic rooms, and expensive in comparison with their income, and considering the little value they receive, these patients should be able to obtain apartments suitably furnished, easily cleaned, and dust-free. Attention should certainly be directed to the provision of quarters properly ventilated, warmed, and exposed to sunlight. The proposed establishment should be under the management of a woman who possessed a knowledge of housekeeping and had undergone a special training for the work and understood the habits of the poor. Such a one might be found among tuberculosis visitors. She would be able to control the lives and habits of the inmates. I have met official tuberculosis visitors whose work in this capacity would be invaluable. These arrangements would go far to limit one cause of tuberculous infection, and what a change it would be for some of the chronic cases now undergoing what is euphemistically called "domiliary treatment"

THE RIGHT SIDE OF THE HEART IN PULMONARY DISEASE

By Leonard Hart

(Condensed from *New Orleans Medical and Surgical Journal* 88: 225, 1935.)

The pulmonary diseases which are most commonly productive of right cardiac disease are "bronchial asthma, emphysema, chronic bronchitis, pulmonary tuberculosis of the fibroid type, bronchiectasis, silicosis, and pneumoconiosis, rarely new growth and pressure exerted by growths in the mediastinum"

The symptoms in the progressive type of pulmonary disease may vary from a slight cyanosis and dyspnea with occasional palpitation to Auerz's "black heart." "The symptoms of the primary lung condition can easily overshadow those of a beginning right heart failure, making it very difficult to distinguish the early cardiac involvement. But as time goes on the cyanosis increases, the dyspnea becomes pronounced, even present on very

slight exertion, attacks of palpitation increase with appearance of edema around the ankles. As the heart pathology increases, of course, passive congestion of all the viscera takes place with the associated symptoms particular to the organ involved."

"At the beginning the physical signs may be very meager. The heart borders are hard to make out, the tones are weak and the murmurs are seldom heard. One sometimes hears a systolic murmur, however, over the ensiform cartilage. There is, at first, very little change in the rhythm, maybe only an occasional extrasystole, provided only the ventricle is involved. Electrocardiogram may show a pronounced right axis deviation which is of considerable importance."

When is a Sputum Negative?

TO MANY physicians the laboratory report that a given sputum is negative for tubercle bacilli is

BY
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almost conclusive evidence of the absence of tuberculosis in a patient in whom there is manifest pulmonary disease. A second negative report convinces them that tuberculosis is absent. In most instances their assumption is correct, but to how many does it occur what a so-called negative sputum may really mean? Are the results absolute or relative? It is assumed that negative sputum means that a smear of the material shows no tubercle bacilli on microscopic examination, when the examiner is skilled in preparing, staining and searching the slide.

How accurate is the microscopic method? Will it always find bacilli if present or, conversely, surely detect their absence? The answer is NO. It is apparent that if every portion of the preparation can be gone over with the microscope but few bacilli will be missed, yet such a procedure is rarely practiced, for it would take hours instead of minutes, a method beyond the limitations of most laboratories. Actually, only small portions of the slide come under observation, the greater part of the surface never being seen at all. When in scanty numbers, bacilli can be easily missed or only found by chance.

To determine the accuracy of the usual microscopic examination, carefully counted bacilli in varying amounts were mixed with bronchiectatic sputum and smears were made and stained in the usual way. It was rarely found possible to demonstrate the bacilli microscopically when less than 5000 per cc were present. This method is not entirely accurate for some of the bacilli may have been washed off in staining, but it clearly and consistently demonstrated the limitations of the smear examination. Conversely from 1 to 5,000 bacilli may be present in a small amount (1 cc) of sputum and yet the microscope ordinarily fails to reveal them. Other observers have put the number as high as

100,000 per cubic centimeter. It is thus clear that a negative sputum report may be entirely contrary

to the real facts of the case, a matter of vast importance where the diagnosis may depend on the laboratory. Recognizing this inadequacy, the problem is how to increase the concentration of the bacilli, or their actual numbers, so they will come within the range of vision or give other evidences of their presence.

Many laboratories are now concentrating sputum specimens as an aid to the recognition of rare bacilli. In this process large amounts (1 oz) of sputum are digested and liquefied by the aid of certain dilute alkalis or acids. After proper neutralization to obtain a minimal but necessary precipitate, the liquid mass is centrifuged at high speed and the sediment or a part of it stained and examined microscopically. Thus the insoluble part of the sputum is reduced or compressed to a small bulk, resulting in more such material (bacilli) per unit of sputum. By concentration, the whole sputum, or a cross-section of it, is examined, depending on the amount of sediment obtained. It must not be forgotten that all insoluble substances are thrown down on centrifuging such as ordinary dust, carbon particles, etc. A high speed centrifuge is a necessity for concentration, it is as essential as the microscope in finding bacilli. When concentration methods fail to give better results than direct smears, it is suggested that the method may be at fault and, although the sputum may be liquefied, it is not necessarily concentrated. Among 500 sputums from patients newly admitted, 316 were found positive on direct smear (one slide). When the identical negative smear sputums were concentrated, one-third of them were found to be positive microscopically. With these results in mind, it may be stated with assurance that concentration, properly done, is a worth-while and valuable procedure.

Even after concentration, assuming that

they are present, the number of the bacilli in the sediment obtained may be too few to be readily detected with the microscope. The limits of intensive microscopic examination have now been reached. Any future detection of bacilli must depend on the actual, not relative, increase in the number of bacilli. We must grow them so that by force of numbers they declare their presence. Bacilli can be readily grown from even such contaminated material as sputum, provided the material is properly prepared or treated and a suitable medium utilized. Recent investigations show that egg-yolk, or egg combined with potato, afford the base for mediums relatively easy to make and capable of growing rare bacilli. A medium consisting of egg and potato combined was found to give results equal in every respect to animal inoculation, and had the advantage that positive results could be read much sooner than in the guinea pig.

The guinea pig, nevertheless, is still the most popular method of detecting rare bacilli and it is only recently that its pre-eminence in this field has been threatened by improved culture methods. The guinea pig is for all practical purposes a vital culture medium, self heating and of an assured composition, but it has to be fed and is subject to the usual vicissitudes of laboratory animals. Inoculation requires less skill than culturing, but it is more costly. Few laboratories can do both either is adequate.

The sediment obtained by concentration is used for culture or inoculation. It is necessary to have it neutral or nearly so. The digesting agent (usually sodium hy-

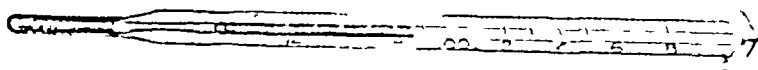
droxide) tends to inhibit the growth of the usual contaminants but does not interfere with the development of tubercle bacilli provided the digestion period is not too long. Anticipating either of these final maneuvers, it is necessary to handle the sputum aseptically, using sterile glassware and covering when centrifuging. It is well to have the containers in which the sputum is originally collected sterilized before use. Inoculation or culture are clearly valuable procedures for, in the series above mentioned, nearly one half of the concentration negative specimens were made positive by these methods.

A summary of results in the examination of 500 sputums shows 316 positive on direct smear (one slide examined). When the negative smear sputums were concentrated, one-third of them (66) were found positive microscopically and, of the remainder, 55 turned out to be positive by inoculation or culture, 437 positive resulted in all. Tubercle bacilli were found in 90 percent of these cases by the examination of *only one specimen of sputum*. It is probable that repeated similar examinations would increase this percentage. The vast majority of these cases had recognized tuberculosis, non-tuberculous pulmonary disease accounting for 4 percent of the total.

The additional positives obtained by the methods described above are sufficient in number to encourage their use when examining sputums from suspected cases of tuberculosis. *No sputum is truly negative unless it has successfully run the gauntlet of the animal or the culture tube as well as the microscope.*

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ABSTRACTS

COHN, ALFRED E and LEWIS, WILLIAM
H Lobar Pneumonia and Digitalis Amer-
ican Journal of the Medical Sciences, 189 457-
482 (April) 1935

The question is still undecided whether the action of digitalis benefits patients suffering from lobar pneumonia. The authors made an analysis of 1456 cases to ascertain what influence the action of digitalis has on the course of this disease.

Patients suffering from lobar pneumonia encounter risks far from uniform. The risk varies, presumably, with the kind and number of factors of an untoward nature which each case presents. The authors have singled out eight such factors, as follows:

- A Type of work
- B Type of pneumococcus
- C Age
- D Alcoholism
- E Bacteremia
- F Number of lobes involved
- G Cardiovascular affections
- H Complications

Having done heavy work presents an added risk, so does infection with pneumococcus types II and III, age is distinctly a factor and is the more serious the higher the decade, the risk being three times greater after than before the age of 40, mild alcoholism is apparently of no consequence, the presence of bacteria quadruples the danger and its continued presence raises it about eight times, involvement of more than two lobes of the lungs raises the risk from 24 per cent (two lobes) to 41 per cent (three lobes) and to 75 per cent and 100 per cent when four and five lobes, respectively, are involved, the complications which were encountered have varying significance, the important ones being empyema when not operated upon, pulmonary abscess, meningitis, pulmonary, renal and cardiac affections. In the sense that heavy work, infection with pneumococcus Types II and III, age over 40, more than moderate use of alcohol, bacteremia, cardiovascular affections and certain complications have been regarded

as factors having an unfavorable influence, so may lighter or less severe phases in each of these categories be grouped and the rates of mortality of patients affected by them be calculated. When this is done it appears that the rate is uniformly low—lower distinctly in each class than when the severer phase in that class is experienced.

When none of the untoward factors was present death was rare, there being only two deaths among 288 patients (0.69 per cent).

When only one untoward factor was present, the outlook was favorable or at least not unfavorable, though even under these circumstances the nature of the factor was not without importance. When more than one of the untoward factors was present the rate of mortality rose depending on the number of them with which patients were obliged to deal. With two the rate was 14.4 per cent, with three it began to rise rapidly.

There appears to be little difference whether digitalis was taken or not, except when two, three and five untoward factors were present. If a sufficient dose (0.9 to 1.5 Gm) was given "early" the mortality was less than when no digitalis was taken in those without or with one untoward factor, it was greater otherwise, but the difference is not important. If the time when digitalis was given is regarded, the mortality was less in those without or with one untoward factor, otherwise it was greater, but again the difference is slight. If small doses of digitalis (up to 0.8 Gm) were given the death rate was smaller when there were none, one, two, or three of these factors. But the differences again are small.

The attempt finally has been made to discover whether, among the untoward elements, certain ones, when they were present alone, played a role more or less unfavorable than others when digitalis was given. The aged and the alcoholic were not aided, otherwise it did no harm.



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Whether digitalis was given or was not, whether the size of the dose was small or adequate, whether it was given early or late—all of these considerations appear to be of no deciding consequence. The form of the curve of mortality depends, it seems, entirely on the degree of severity of the affection, when it is slight, death is rare, the more severe, the greater the number of untoward factors against which the struggle must be made, the smaller become the chances of recovery. The form of the curve appears to indicate what the important factor is in deciding the outcome, it is the disease—virulence of the infection and resistance of the host, both together, rather than the action of digitalis.

Aside from having an influence on the size of the heart in pneumonia, digitalis exercises its well-known action on conduction by reducing the rate of the ventricles in auricular fibrillation. The course of events in all the cases of auricular fibrillation and the cases of auricular fibrillation and auricular flutter has been reviewed (31 patients, of whom 18, 58 per cent, died). The cases have been analyzed, though the number is small, from the point of view of the general mortality, of the age of the patients and of the other untoward factors which they presented. It was apparent that, if the cases are grouped according to the number of the "untoward" factors against which they were required to contend, the outcome in those who suffered from two (of which auric-

ular fibrillation was one) was strikingly better than that in the general series. When there were three factors (of which auricular fibrillation was one) the death rate was actually lower than the rate in the case of those who took digitalis. The three patients who died were seriously ill. When there were more untoward factors there was no important difference from the general curve of mortality. The influence of age on the development of auricular fibrillation is not certain.

Whatever may be learned from greater experience concerning the influence of fibrillating auricles on the outcome of lobar pneumonia, this at all events is apparent from the few observations which it has been possible to make, the chances in those in whom it is present are not worse than in other patients. Giving digitalis has been useful when no more than two untoward elements (besides auricular fibrillation itself) were present, the rate of mortality was favorably influenced. When there were more untoward elements, the chances were not worse than they would otherwise have been.

It appears that in those cases in which the outcome depends on safeguarding patients from the unfavorable effects of the rapid rate in auricular fibrillation and auricular flutter the administration of digitalis may be life saving.

Digitalis should not be regarded as an agent necessarily having an influence on the natural history of the pneumonic or pneumococcal infection.

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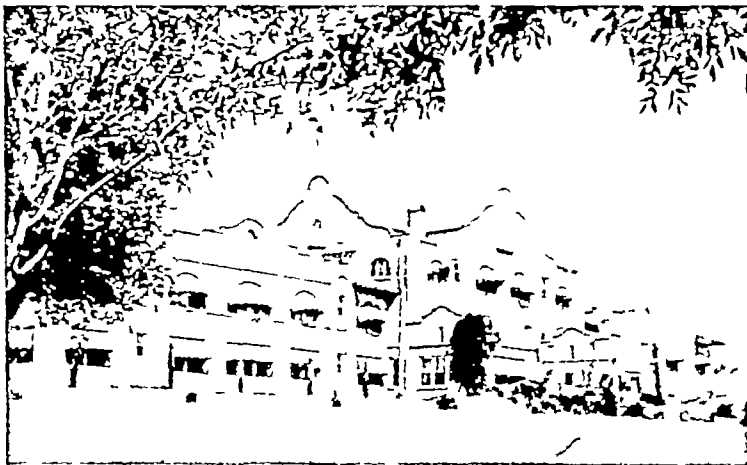
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CASE REPORTS

Mrs E A S Age 31 White Married, one child, 3 years of age

Family History Negative, in so far as tuberculosis is concerned, although was reared in a separate building with her family apart from a large tuberculosis sanatorium, her father being Superintendent of the sanatorium Had all the diseases of childhood One normal delivery

Chief Complaint Progressive weakness, distressing cough, irregular fever, anorexia

Present History Has always been well until latter part of May 1933 when an abscessed tooth was removed Following the removal of tooth patient developed severe cold, accompanied by severe cough and some indefinite chest pains On July 21st, 1933, had a disturbance at the site of the removal of the tooth, at which time the dentist removed a small portion of the alveolar process, at the point of extraction On her return to her home after this procedure she had a chill About July 28th, 1933, it was noticed, by the patient, that the cough which had been present became worse accompanied by pain in the right upper chest with fever 101 Her family physician was called who made a diagnosis of influenza and treated her accordingly The cough, expectoration, frothy mucoid material persisted and a sputum examination at this time was negative for tubercle bacilli and a fluoroscopic examination was reported negative for any pathological condition in the lung

On August 22nd, 1933, the patient was referred to me for examination, my findings on that date were as follows Patient weak and depressed and appeared to be very ill She had a very severe cough, explosive in character, moderate amount of mucoid material, streaked with yellowish material Patient's temperature $100\frac{1}{2}$, pulse 118, weight 103 normal weight 113

Physical Examination

Inspection Depression above and below clavicle

Palpation Fremitus greatly increased over upper right lobe

Percussion Dullness from clavicle to fourth rib and to third interspace

Coin test Evidence of cavitation in the third interspace

Auscultation Right Lung Increased whispered voice sounds over upper lobe area, no definite rales made out in this area The remainder of the lung shows the breath sounds to be normal

Auscultation Left Lung Negative

R-L-X-Ray Findings Hilus shadow is heavy and dense Radiating out from the third interspace, anteriorly, there is a dense area about 5 cm in length by 3 cm in breadth with mossy striations extending into the middle zone The upper bronchial tree is faintly outlined with fine interweaving and very minute studding The lower bronchial tree is mossy and cottony with some studding throughout The lung is well aerated

L-L-X-Ray Findings The hilus shows some thickening with a fan shaped area extending from the third interspace up into the apex There is minute studding throughout the upper bronchial tree The lower bronchial tree shows some studding and mossiness The base is slightly more hazy than the right lung The lung is well aerated

Laboratory Report Urine negative

Blood Examination

Wassermann	Negative
Hemoglobin	80%
White cells	17,800
Polys	85%
Leucocytes	9%
Monocytes	6%

Sputum Examination

Patient was asked to cough and expectorate into a metal container, when she did this a slight metallic sound was noticed and on close examination a small hard substance was found in the sputum This was examined and found to be a small portion of an amalgam filling She was sent at once to her dentist who examined all of her teeth in order to ascertain whether the filling had just dropped from the tooth at the time of expectoration He reported no missing fillings or portion of fillings Microscopically, the sputum contained pneumococcus, staphylococcus and some fusiform bacilli, no tubercle bacilli were found

Diagnosis Abscess of the lung Due to inhalation of a portion of amalgam filling which occurred, undoubtedly at the time of the extraction of a tooth on July 21st, 1933

Progress Patient made a gradual and uninterrupted recovery after about four months Since that time patient has reported from time to time for examination, no recurrences, and at the present time, nearly three years later, is in good health

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THE PROPER USE OF REST

(Continued from page 9)

stand in the first interview that it is his disease, that it is his life that is at stake, that it is he who must take the cure, that you can point the way and be the guide, but that you cannot and will not take the cure for him, and that whether he gets well or not will depend, to a large extent, upon his ability to reconcile himself to what he has, what he must do and how he must do it. That is, treat him with judicious sympathy.

While we must have certain general rules and regulations, especially in large institutions, I do not believe in trying to get the patient to take the cure by furnishing him with printed rules and regulations. Speaking from my experience as a patient and as a physician as well, I feel regulations and rules handed out in that manner engender in the average patient a strong desire to break them.

Some may feel that what I have outlined as to the regulation and enforcement of these phases of the cure is too great a task for the physician and that

he does not have time to go into such details. If the physician feels that way, he is too busy for his job. The ideal sanatorium has been described as an atmosphere, which reflects the attitude of the physician not only toward his patient, but toward life in general.

It may also be said that a certain class of patients may be handled in this manner while others, especially those of low intelligence, can not. From my experience of seventeen or eighteen years, devoted intensively to the handling of tuberculosis in private practice and in public institutions, I am convinced that, while certain patients are more amenable to this method of handling, there are no patients, as a class, that cannot be thus managed. It is also my conviction that it is by far the most effective method for getting tuberculous patients well and that it brings to the physician the greatest degree of satisfaction and joy through a work well done.

PUTRID LUNG ABSCESS

(Continued from page 16)

two or three ounces, and by the end of ten days, was not more than one ounce. He gained rapidly in weight, and at the time he was discharged, he weighed 187 pounds, and was free of cough and expectoration.

Conclusions

1 Putrid lung abscess is definitely a clinical and pathological entity, bronchogenic in origin, produced and maintained by pathogenic anaerobes, usually *Aspergillus* or mixture of Vincent's and other anaerobes.

2 Nearly always situated near surface of lung.

3 Rarely demonstrable with the x-ray in the early stages. Fluid level appears late. More easily determined immediately following postural drainage. Bronchoscope and Lipiodol injections ineffective for diagnosis.

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THE TRAGEDY OF THE CONTRA-LATERAL LUNG

(Continued from page 11)

The more I engage in collapse therapy, the more I am inclined to believe that the best gauge as to the success or failure of this method, placing it ahead of the temperature curve, the weight curve, the physical examination and even the x-ray investigation, is the question of sputum conversion. The conversion from a positive to a negative sputum, and its main-

tenance there, tends to insure success, whereas the failure of conversion or the reappearance of a positive sputum afterwards, portends that tragedy about which we have been writing.

With the tragic occurrence disease in the contra-lateral lung, many things can be tried and much done—but that is another story.

TUBERCULOSIS AND BRONCHIECTASIS

(Continued from page 12)

and relieves the attacks in asthmatic cases. When the bronchiectasis is due to obstruction of the large bronchi at the hilus some relief is obtained by the introduction of Lipiodol but a recurrence of shortness of breath, wheezing and intermittent sputum may occur.

Primary foci of infection, especially of the upper respiratory tract, must be cleared as much as possible. Autogenous vaccine injections or the use of ordinary stock vaccine injections have proven very beneficial. Where considerable sputum is present, without fever, postural drainage should be encouraged. When a unilateral case of bronchiectasis with tuberculosis occurs, paralysis of the phrenic nerve may permit sufficient rise of the diaphragm to close some of the bronchiectatic pockets.

Artificial pneumothorax has not proven of any permanent value. It is not wise to attempt intra-pulmonary surgery in the bronchiectatic cases.

To summarize it is wise to remember that tuberculosis and bronchiectasis can occur in the same patient, that patients with severe cough and expectoration, that cannot be accounted for by the amount of tuberculous changes, should be suspected of having bronchiectasis and if they are not of the hemorrhage type they should have Lipiodol injections into the bronchial tree both for diagnosis and treatment, all upper respiratory foci of infection should be eliminated if possible, advanced cases of bronchiectasis should have postural drainage and immunization by vaccine.

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"FIRST of all remember that the diagnosis of tuberculosis is not a sentence of death as it was supposed to be thirty or more years ago. The evidence of disease in early cases often completely disappears, and under modern treatment more advanced cases can be restored to health and work.

Secondly, remember that the atmosphere of the building in which you are living depends on the attitude of the individuals therein. Do not bore your neighbors with repeated discussion of your symptoms. Don't frighten a new patient with gloomy or terrifying predictions. Don't isolate yourself from your neighbors. Solitude is apt to have the effect of magnifying out of all proportion minor irritations."

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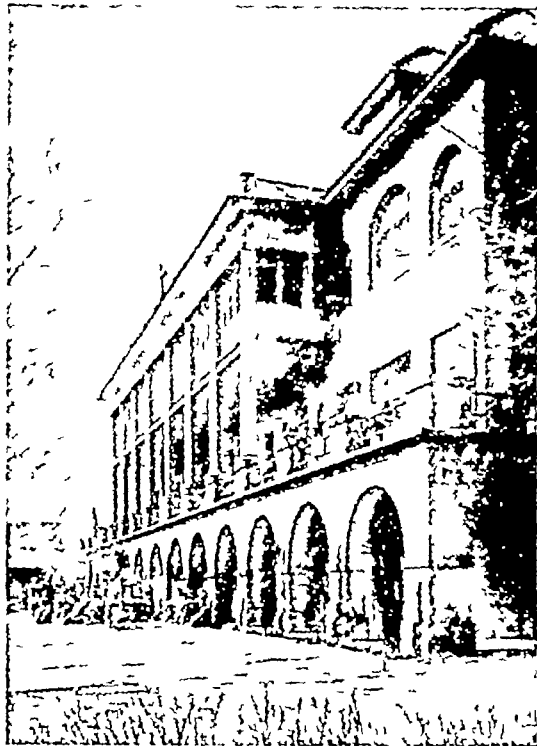
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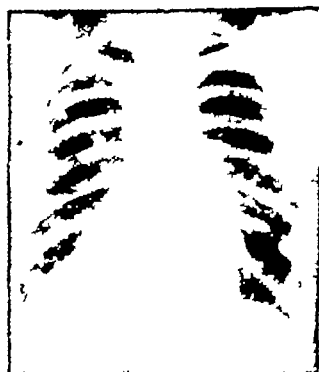
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At left—Plain Roentgenogram

At right—Lipiodol Bronchogram



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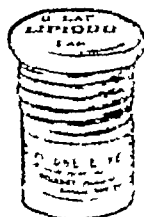
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COMMITTEE ON ECONOMICS FEDERATION OF AMERICAN SANATORIA

(A National Association of Private Sanatoria and Chest Specialists)

COTTON AVENUE AND WYOMING STREET
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February, 1936

Gentlemen:

In the January issue of the DISEASES OF THE CHEST, the Committee on Economics of the Federation of American Sanatoria introduced to industrial and welfare organizations a national service of chest specialists and private sanatoria thruout the United States, as listed below, for the hospitalization and care of your tuberculous members and those suffering with other chest ailments. If you did not read that open letter, we will be pleased to send you a copy of same.

Private individual care is an important factor in the treatment of tuberculosis; each case presents a separate problem and must be studied by competent chest specialists and the proper treatment prescribed. The Federation of American Sanatoria now brings you this service. It is organized in the interest of the tuberculous patient and we urge you to learn more about it.

The Committee on Economics will be pleased to assist you in working out a problem for the care of your tuberculous members. Please address all communications to the Committee on Economics at the above address.

Sincerely yours,
COMMITTEE ON ECONOMICS
Federation of American Santoria

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DISEASES

OF THE

CHEST

Official Organ of the Federation of American Sanatoria
 Editorial offices 1018 Mills Building, El Paso, Texas
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(A MONTHLY PUBLICATION)

"The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind"

Lawrason Brown, M D

Editorial Comment

To Our New Readers THIS ISSUE of the DISEASES OF THE CHEST publication will come to many readers

for the first time. The journal is now completing its first year in the field of medical sciences. It is the aim and purpose of the editorial staff of DISEASES OF THE CHEST to bring to the busy physician short, concise articles on chest diseases written by specialists with long training in this branch of medicine.

The editorial policy of DISEASES OF THE CHEST is, *first*, the early diagnosis of chest diseases and, *second*, segregation of the open case of tuberculosis.

Our Motto "CLOSE THAT CAVITY!"

You will find a special subscription offer on the back inside pages of this journal.

M K

The Field of Chest Diseases A FEW BRIEF YEARS have brought about a great transition in industrial medicine. Surgery for the injured was formerly the only interest taken in the health of the employed. Today industry's greatest interest is in tuberculosis and silicosis diseases undermining the health and efficiency of employees. It cannot be too strongly emphasized that the study and treatment of pulmonary diseases constitute a true specialty of internal medicine. Internists have always been prone

to recognize surgical conditions and refer such cases to surgeons, and in large medical staffs to have surgeons available for that department of service. Surgeons who head the medical staffs of great corporations should be as quick to recognize the value of specially trained men for the diagnosis and treatment of pulmonary diseases. It is an insufficient service for the physician handling pulmonary cases to be able to read an x-ray film of the chest. Trained Phthisiologists, or Chest Specialists, should be retained on all medical staffs of great corporations, to make the necessary clinical, pathological, etiological and economic researches.

O E E

Group Insurance IF GROUP INSURANCE is carried by an industry for its employees a compensation policy for sufferers from silicosis is as practical as it is for other diseases and for injuries. To the extent there is disability in silicosis, it is permanent, and the disease is not amenable to treatment.

Tuberculosis is a much more complicated situation. The disease in its minimal moderately advanced and many cases from the far advanced group is amenable to treatment and may not result in total disability, but only partial. If treatment can prevent serious permanent disability it is greatly to the interest of the patient, to

the industry purchasing group insurance, and to the Insurance Company itself, that treatment of tuberculosis be a feature of the policy. Experience has proved that compensation to the sufferer from tuberculosis, even though adequate, is not always used to the best advantage by the patient himself for the treatment of his disease and his temporary disability may, through such neglect, become a permanent one. The policy should, therefore, provide for hospital treatment of tuberculosis for at least one year before a permanent rating is given and the case placed on compensation status only. O E E

Our Kansas City Meeting WE HAVE recently received the following letter which is of great interest to all members of the FEDERATION OF AMERICAN SANATORIA

"I am glad to inform you that the council on the scientific assembly at its meeting held a few days ago in Chicago decided to have one session in the section on miscellaneous topics at the Kansas City Session of the American Medical Association for the purpose of a program dealing with tuberculosis"

OLIN WEST, M D,
Sec'y and Gen'l Mgr
American Medical Assn

This makes it possible for the Federation of American Sanatoria to meet at the same time as the American Medical Association and to have a place on the program. It is the sincere hope of all of us that, eventually, a section on Diseases of the Chest will be permanently established by the American Medical Association.

The importance of a continued educational program, especially for the medical profession at large, on Diseases of the Chest, with special reference to tuberculosis, is being recognized more and more by men who have chosen Diseases of the Chest as a specialty. It being our purpose to carry on such a campaign we therefore greatly appreciate the fine spirit of co-operation on the part of the

officials of the American Medical Association as is evidenced by the above communication. C M H

Cost of Hospitalization of the Tuberculous IN THE STUDY carried on by Doctor Frijo H Arestad and which was published in the

A M A journal of December 7th, 1935, he discusses the daily per capita cost as gathered from the reports from 410 sanatoria, 89 tuberculous departments and 15 preventoria. The average daily cost per capita are given as follows:

Veterans Bureau Hospitals	\$3 98
Other Federal Hospitals	3 66
State Sanatoria	2 01
County Sanatoria	2 10
City Sanatoria	2 04
Private Sanatoria	2 94

From the above figures it is easily noticeable that of the tax-free sanatoria, the Federal Hospitals are the most expensive to operate. The next most expensive are the County sanatoria, the third most expensive are the City sanatoria, and the least expensive are the State sanatoria.

Although the private sanatoria rank third in the cost per capita per diem, it must be remembered that the Federal, State, County and City costs are for actual operation and do not have taxes, depreciation and interest on investment and insurance. While the private sanatoria have all these extra costs to meet besides the cost of actual operation.

From the above figures one can see the position in which private sanatoria are placed, when it is considered that they are paying taxes for the upkeep of competitive tax-supported institutions, that are in many instances much more expensive to operate than the private sanatoria.

In the great majority of instances these private sanatoria are paying taxes on empty beds, while nearly all tax-supported sanatoria have waiting lists. We feel that when the medical profession fully realizes this situation, steps may be taken to correct this mal-adjustment between the tax-supported and the tax-paying sanatoria.

C M H

The Tuberculous Negro IN AN ARTICLE in this issue, Dr M A Thomas, a colored physician in Atlanta, Georgia, brings home to us rather forcibly the plight of our Southern Negro population. What he writes concerning his people in Atlanta is true to a large extent throughout our Southern States. The tuberculosis death rate in the Negro race in this section far exceeds that of the white population—often in a ratio of 4 or 5 to 1.

Indeed, tuberculosis ranked seventh as a cause of death among the white population and second among the Negroes in the south in 1934. The actual incidence of the disease among these people can not be accurately estimated.

There must be some cause for this wide variation, and it appears that Dr Thomas has called our attention to the most important factor when he points out that there are relatively few hospitals or sanatorium beds available for the colored population. This not only means that the tuberculous Negro is not given the benefit of proper care, but, and equally important, the open case is not segregated as he would be were sanatorium beds available. There is undoubtedly some virtue in educational activities among these people but education will only scratch the surface, without facilities to carry out proper treatment and without the segregation or isolation of a larger number of the open cases.

There is considerable controversy regarding a possible greater susceptibility of the colored race to tuberculosis. The Tuberculosis League of Pittsburgh in an extensive report, "Tuberculosis and the Negro in Pittsburgh, (1934)", revealed that the tuberculosis death rate in 1933 for Pittsburgh Negroes was 247.3 per 100,000 population as compared to 40.9 for white persons. The report states "The degree of admixture of Negro blood seems to be an unimportant factor in the tuberculosis rate as the incidence of disease varied but slightly in light or dark negroes." And further, "In any population group, regardless of race, where poverty is associated with over-crowding, lack of

privacy, lack of sunshine and ventilation, and ignorance of the laws of hygiene, a high rate of tuberculosis may be expected. The high rate revealed in the local Negro is therefore not surprising. Nor is it to be wondered at that 17.5 percent of the children under five reacted to the tuberculin test, that almost half of the infected children under ten showed evidence of disease, and that the rate of adult tuberculosis in children under fifteen was exceedingly high (33 percent). Because of the high rate of infection and disease disclosed in the children, especial consideration of their needs is warranted if the prevalence of tuberculosis is to be lowered in the oncoming generation. Contact between the open case and the child must be broken. The ideal means to this end is the hospitalization of the open case."

R B H, JR

Oral Hygiene ON PAGE 20 appears an article entitled "The Importance of Mouth Hygiene in the Treatment of Chest Diseases." This is an important subject and should be studied by all of our readers. No examination of a patient, regardless of what the diagnosis may be in the end, is complete without a thorough study of the teeth and gums. Not a few abscesses of the lungs can be traced directly to mouth infection, dental caries or the inhalation of small loosened fillings. In the treatment of pulmonary tuberculosis, thorough dental examinations and care may be the important link between success and failure of the patient to respond to the usual academic method of treatment. We cannot emphasize too strongly the importance of oral hygiene under any circumstance, and especially, in the diagnosis and treatment of Diseases of the Chest.

C M H

SKIN TESTS for tuberculosis are of no value clinically unless the positive reactors are subjected to x-ray examinations. The positive tests merely indicates tuberculosis infection, the x-ray finds or eliminates active disease.

Modern Methods of Diagnosis and Treatment In Pulmonary Tuberculosis

THIS EVENING I am going to call your attention to some very practical points in

the recognition of pulmonary tuberculosis, and in the selection of appropriate methods of treatment. Most practitioners consider the diagnosis of the early stages of this disease as difficult and requiring a specialized training. This is hardly true, because the early diagnosis in the large proportion of patients can be easily made if the physician will give a little time to the problem and remember a few diagnostic points.

Cough—Primarily, the diagnosis depends upon us being ever suspicious and watchful of a chronic pulmonary lesion, and upon the care which we use in taking the history. It is a safe rule to be strongly suspicious of tuberculosis in any patient that has a "cold in the chest" or a *cough lasting 5 weeks or longer*. Chronic bronchitis is not a disease entity, but is symptomatic of some underlying condition (pathological), such as bronchiectasis, abscess, malignancy, or, as it is more commonly, Tuberculosis. I believe that we are never justified in making a diagnosis of Chronic Bronchitis. While on the subject of history, let me stress the importance of three other cardinal symptoms.

Fatigue—(1) *Fatigue* or the sensation of lack of endurance. The patient will frequently complain that he feels lazy or that he is unable to carry on with his usual daily work with ease. The patient then makes the mistake of not coming to his doctor immediately, but instead, tries to force himself to still greater efforts.

Pleurisy—(2) Past history of *Pleurisy* is indicative of tuberculous infection in 90% of cases where no definite cause has been found. This, of course, excludes such causes as fractured ribs, pneumonia, ma-

BY

ROSS K. CHILDERHOSE, M.D., M.Sc. (Med.)

Allentown, Pa.

lignancy and abscess

Hemoptysis—(3)*Blood spitting*, especially when it is of a

fluid diam, 1 or more. Unfortunately patients are often told that this blood is coming from a broken blood vessel in the throat, and the serious significance of the hemoptysis is lost.

Percent of Cardinal Signs—In a study of 300 cases of minimal Tuberculosis, the incidence of the five cardinal signs was found as follows: 27% had rales, x-ray evidence was present in 99%, hemoptysis as frequent as the rales, namely 27%, while the sputum was positive for tubercle bacilli in 35% of cases, and there was a history of pleural effusion in 12%.

X-ray and Physical Examination—Up to within recent years great importance was placed on the physical examination of the chest, and still is by many physicians. I must confess that valuable as is the physical examination, yet, I place more confidence upon a carefully taken history and a good x-ray picture. Unfortunately, x-ray films may be of poor quality, and therefore, of difficult interpretation, but a properly exposed picture will reveal tuberculosis lesions long before rales can be heard by the stethoscope. This superiority of the x-ray over the physical examination has been strikingly brought out in a comparison of the physical findings, and the x-rays of 1,000 patients having tuberculosis. There were none of these that had definite physical findings, but did not have x-ray evidence. In 200 of them the extent of the disease was present by x-ray, but the physical signs were normal. In other words, 400 cases would have been missed had not an x-ray been taken. In another study, made at the Trudeau Sanatorium, of 500 patients with cavities in their lungs as shown by the x-ray, the physical signs, as indicating a cavity were present in only 5%. These figures are startling in their

*An address delivered to Luzerne County Medical Society (Pennsylvania) September 18, 1935.

demonstration of the inadequacy of physical signs

Sputum—Many physicians depend upon the sputum examination for their diagnosis. Unfortunately, by the time a patient has developed a positive sputum, he has advanced to open ulceration of his lungs. There are, indeed, many times that the diagnosis is puzzling, and the sputum examination is required to make a differential diagnosis certain. In the vast majority of patients, however, it is not necessary to depend upon the sputum, and this examination should be used only to confirm a diagnosis that has already been made. Strange to say, a positive sputum is of more importance in evaluating the treatment than it usually is in diagnosis. This point will be discussed shortly.

Summary Diagnosis—Lawrason Brown's advice on the matter of diagnosis is most appropriate. "The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind." A combination of any one of the following, is sufficient to make a tentative diagnosis of the disease: (a) History of Pleurisy, (b) History of unexplained hemoptysis, (c) History of cough lasting 5 weeks or longer, (d) Persistent rales heard after expiratory cough above the level of the second rib, anteriorly, or above the level of the fifth dorsal vertebra, posteriorly, (e) Evidence on the x-ray film of pulmonary pathology above the second rib, anteriorly, or the fifth dorsal vertebra, posteriorly. A combination of any two will make a definite diagnosis.

Treatment of Hemoptysis—The treatment requires much more care and study than does the diagnosis. This fact is not generally appreciated because many physicians consider that the only treatment is largely in keeping the patient quiet, and giving him varying quantities of cod liver oil and cough mixtures. That may have been true 20 years ago, but tuberculous patients deserve modern methods of treatment just as do diabetic patients. Even in the treatment of Symptoms we are chang-

ing our methods. For example, we never give morphine in the treatment of hemoptysis. The first effect of morphine is to abolish the cough reflex, and though the bleeding may (and usually does) continue, yet, it is not expectorated, and flows into healthy parts of the lung. Almost invariably, this blood carries with it tubercle bacilli, and we have a subsequent spread causing either a mild or severe tuberculous pneumonia. I have seen patients drown in their own blood because they had been given morphine or codeine. If the patient is restless or frightened, one of the Barbituric acid derivatives is all that is necessary to control his fears. Morphine and codeine have no hemostatic action of their own. Nearly all hemoptysis will stop of their own accord, and the only reliable method of controlling the bleeding is by pneumothorax.

Calcium therapy—The use of Calcium, Parathyroid Hormone and hemostatic serum, have been given up as useless. The routine use of calcium in tuberculosis has also been dropped because we believe that tuberculous patients do not suffer from a hypocalcemia but that they have a normal supply and further, that calcification of a lesion will not occur for some years after the lesion is healed. The lesion must be thoroughly fibrosed before calcification will take place.

Cough—The cough is one of the minor symptoms that we are called upon to treat. We use codeine liberally to check an unproductive cough, but never a productive cough. Severe paroxysms of coughing require good doses of codeine because the paroxysms are not only exhausting to the patient, but they frequently cause, by their mechanical hammering on the stomach, vomiting. This is itself too hard on an already undernourished patient.

The symptomatic care is simple, but it should not cause us to forget the basic principles in the treatment of this disease. These are, *Rest, Nourishment, and Time*. *Fresh air* is often included but, while necessary, it is not as important as the other three. In the past, far too much importance

was placed on Fresh Air, so much so, that people considered that it alone would cure them. I have seen quite a number of tragedies caused by the patient being advised by some one to get out into the country for a few months, and get plenty of Fresh Air. The result was that the patient did not observe the fundamental laws of Rest, Nourishment, and Time, and, instead went for walks in the country or played golf. This is about the quickest way to cause the disease to advance.

Time—I think that we do not sufficiently realize the importance of the factor of time in the treatment of tuberculosis. The more we treat this disease, the more do we recognize that we are not giving sufficiently length of time to its treatment. Years ago, it was said that Tuberculosis was a disease that was characterized by recrudescences. That was because we did not know that it takes at least a year to cure the smallest amount of tuberculosis, and rarely do we see a patient in this early stage. The physician's greatest difficulty in handling the patient is not when he is sick, because then he will follow the physician's instructions implicitly, but it is when he feels and looks well. When our patient is feeling like his old self, then, it is very difficult to convince him that a slight amount of exercise will break down the delicate defense that he has so slowly built up.

The modern method of treatment is best exemplified in the many ingenious ways that have been devised to give artificial rest to the diseased lung. We realize that a localized rest to the lung greatly decreases the tuberculous toxemia, and aids in the healing of the cavities. A collapse of this diseased portion of the lung, with its subsequent immobility, has three distinct effects.

Circulation—(1) A decrease in the circulation of the part, and which, therefore, causes a decrease in the lymphatic drainage with lessened absorption of the tuberculous toxemia, and increase of fibrosis.

Anoxaemia.—(2) A relative anoxaemia, with increase of the CO₂ tension in the col-

lapsed pulmonary tissues. These two factors account for the almost miraculous improvement in patients who have had artificial rest. We can understand this by remembering that decrease of lymphatic drainage means decrease of tuberculous poisoning, and a decrease of oxygen with a corresponding increase of CO₂ tension renders the soil most unsuitable for the proliferation of the tubercle bacillus.

Closure of Cavities—(3) While the above two factors are at work a third result occurs in a good collapse, that is, any cavities present are collapsed, and their walls approximated. In a short time this causes a disappearance of tubercle bacilli from the sputum. We regard a positive sputum as a very serious menace, a menace not only to those with whom the patient associates, but also to himself. Sputum that contains tubercle bacilli will invariably, in the course of time, cause a further spread, either in the same lung, or into the other healthy lung. We see so many patients who have had a bronchogenic spread from their own sputum, that we consider the *first requirement of tuberculosis therapy is to render the sputum free of tubercle bacilli*. It is also safe to say that the majority of patients who have a positive sputum have already advanced to the stage of cavity formation. It may be true that the cavity is very small, but erosion has taken place sufficiently to liberate tubercle bacilli. With these requirements in mind, let us consider the various applications of artificial rest and collapse therapy.

Pneumothorax—First of all, we have the familiar artificial pneumothorax. This has come into wide use, and unfortunately, the risks and dangers of it are not generally realized. The technic is simple, but requires the utmost precision and thorough knowledge of tuberculosis. When air is insufflated into the pleural space, it tends to rise to the apex of the space in accordance. Fortunately, tuberculosis has a predilection for the apex, and thus there is a natural selection of the diseased area by the collapse. Various degrees of col-

lapse can be maintained sufficiently to close the cavities, and render the sputum free of tubercle bacilli. The recovery of the patient depends upon the degree of collapse obtained. It has been proven, without a doubt, that the more complete is the collapse, the lower is the ultimate death rate. For example, in a study of 600 patients in whom pneumothorax was attempted and, who were followed for a period of 5-10 years, it was found that those who had a satisfactory collapse, 58% were in good health, and 22% were dead at the end of this time. In the group that only had a partial collapse, there were 22% in good health at the end of that time, and 58% were dead. In the group in which pneumothorax was attempted, but was unsuccessful because of pleural adhesions obliterating the entire pleural space, 15% were alive, and in good health, and 70% were dead. These figures are a striking proof of the absolute necessity to give the lung some form of artificial rest. The chances of your patient being alive in five years is raised from 15% to 70%, if he receives some form of collapse. About 45% of our patients are able to receive pneumothorax treatment. It is evident that the success of the treatment depends upon its induction before pleural adhesions have formed, and should adhesions prevent a perfect collapse, these pleural adhesions must be severed.

I have mentioned that the air rises to the upper part of the pleural space, and so apparently selects for collapse that area that is diseased. In this way, by careful fluoroscopic control, one can maintain a collapse of the diseased area, and permit the healthy part of the lung to be expanded. In this manner, the vital lung capacity of the patient is not encroached upon to any great extent. If the vital capacity is more than 2500 cc. after the first pneumothorax, then we are justified in attempting a bilateral pneumothorax, should the patient have a bilateral lesion. Naturally, bilateral pneumothorax requires much more attention and skill than the usual unilateral type, and is subject to

more pleural adhesions. The great restriction to pneumothorax is the matter of pleural adhesions. This brings me to the recently developed operation of intrapleural pneumolysis.

Intra-pleural Pneumolysis—The operation is performed under local anaesthetic, and the adhesions are severed either by galvano-cautery, or the high frequency cutting current. The entire operation is done under the direct vision of the thoracoscope. The thoracoscope is a modification of the cystoscope, and enables the operator to have a clear vision of the interior of the pleural space. A second cannula is placed through the thorax a short distance from the thoracoscope, and in this cannula is passed the electrode. The adhesion is first coagulated to prevent hemorrhage, and then cut. It is now agreed that the high frequency current is much superior to the galvanic current, because of the less danger of hemorrhage and from the much fewer pleural complications such as effusions. Unfortunately, not all adhesions can be cut. About 30% of adhesions are of the "fold" type which contain lung tissue, and therefore cannot be cut. About 70% of adhesion operations are successful, the failures being due to these "fold" adhesions. Of these technical successful operations, it is said that about 85%, after four years, were working, and of those whose operations were only partly successful from a technical point of view, 50% were working. All of these patients have now a negative sputum. As I told you a moment ago, approximately 15% of pneumothorax patients who have an incomplete or unsatisfactory collapse, recover. By severing their adhesions, it may be possible to convert 70% of them into satisfactory collapses in which the recovery percentage is 60. The mortality rate from this operation in a series of over 300 patients was 15%.

Phrenic Nerve—While pneumothorax is used in the large majority of attempts to collapse or rest the lung, yet, there are quite a number of other methods. Prob-

ably the one next in common use, is the paralysis of the phrenic nerve, either a temporary crush or an evulsion of the nerve on one or both sides. A paralysis of the diaphragm is indicated in a number of conditions, the most important of which is a *basal tuberculosis*. The rest and relaxation secured by this paralysis is very striking and a rise of about 2-3 inches may be expected. Many times in *pneumothorax treatment*, where diaphragmatic pleural adhesions prevent a sufficient relaxation of the lung to cause a closure of the cavity, then a rise of the diaphragm is necessary. The operation is also done sometime in the reexpansion of the lung after a pneumothorax treatment is discontinued. The reexpanding lung is often fibrous, and expands with difficulty. To prevent the healed lesions from being torn open in this reexpansion, it is often advisable to permit the diaphragm to rise and thus lessen the volume to which the lung must expand. The operation is performed under local anaesthesia, and a small incision 1" above the clavicle enables the operator to locate the phrenic nerve as it crosses the scalene muscle. The nerve is then either crushed for temporary paralysis, or evulsed for permanent results.

Somewhat similar to the phrenicectomy operation is the scalenotomy. This has not been practiced to any great extent although, the possibilities of it are great. The incision is made above the clavicle, and the Scaenius Anterior is located and severed. The other two scalene muscles are cut, and the leverage action of these muscles on the first and second ribs, abolished. The operation causes a reduction of the volume of the apex by 40%. The operation is applicable to those cases having small cavities located above the first rib. The operation is so simple, and causes the patient so little surgical shock, that it is having an increasing use in selected cases. In a series of 135 operations, in which scalenotomy alone, or combined with phrenicectomy, were performed, it was found that 35% of these

patients were rendered negative sputum.

Extrapleural Pneumolysis —There is one type of operation that is not as well known as it should be, and if used more frequently, would be of immense help in restoring our tuberculous patients to normal health. This is the "Extrapleural Pneumolysis". In the contra-distinction to the intrapleural pneumolysis or adhesion cutting operation, this operation is done outside the pleura, and is known as the "Paraffine Operation". The purpose is to place a pad of paraffine between the parietal pleura, and the thoracic wall, and by so doing, we secure a localized compression of the lung. The patients selected for the operation are ones in which it is impossible to do a pneumothorax because of pleural adhesions. The incision is made either anteriorly or posteriorly, and a small portion of one rib is resected. The incision is carried down to the endothoracic fascia, where a blunt dissection is carried on, until a sufficient space has been obtained to insert a pad of a specially prepared paraffine, whose melting point is about 50 C. The dissection is carried on mostly over the area of the underlying cavity, and with the placing of the paraffine, the cavity is compressed, and closed. This operation has the advantage that it can be done on both sides in a bilateral case. The results show a large proportion of the patients are greatly benefited under this treatment.

Thoracoplasty —Any discussion of artificial methods of collapse is not complete without a description of thoracoplasty. Thoracoplasty is essentially an operation whereby some or all of the ribs are removed, permitting a collapse of the thoracic wall, with a consequent collapse of the underlying lung. The success of the operation, like all other procedures of this type, depend upon the degree of the resulting lung collapse. The operation may be total in which all the ribs are involved, or partial, where only the ribs necessary to produce a localized collapse are removed. Up to within the last two years, it was the custom to remove portions of the

ribs, but the resulting collapses were usually insufficient, and too much surgery was done at one time. The mortality rates were, therefore, high, and the operation was considered formidable. This old type of operation is giving way to the newer one where the complete rib is removed from its articulation with the spine, to the junction with the cartilage. However, not more than four, and frequently only three ribs, are removed in one stage. In the operation, the periosteum is left in place and in the course of time, new ribs form in the new position of the chest wall, causing a permanent collapse of the lung. When more than one stage must be done, the upper three ribs are removed first, the periosteum touched with 10% formalin, so as to prevent too rapid bone formation, and an interval of three to four weeks given to allow the patient to recover thoroughly before doing the second stage. The operation is best done under cyclopropane and gas oxygen anaesthesia. This newer technic has resulted in a very much lower mortality rate, and a greatly improved collapse of the lung. So successful is it that mortality rates now vary from 5-10%, depending upon the operator. There are quite a number of reports in the literature of a bilateral partial thoracoplasty, the removal of a few ribs on each side, for bilateral cavities. The reports show that the results are very satisfactory.

Thoracoplasty is used in those patients in whom pleural adhesions prevent a pneumothorax therapy, and the results, when taking into consideration the low mortality rate, justify no hesitation in those patients who are reasonably good surgical risks. In this type of work it is highly necessary to have complete co-operation between the Tuberculous Specialist, and the Surgeon. This team work has caused the great advance in the past few years. In a series of 3,000 thoracoplasties by various operators, there was a death rate of 10%. Of these 3,000 patients, in a five to ten year follow-up, 35% were free of symptoms and working

and free of tubercle bacilli, and only 5% were made definitely worse by the operation. Incidentally, there were on record twenty-two women who have had this operation and later have borne children.

Continuance of Treatment—With all these various forms of artificial rest, it is important to remember that while the lung is placed in a more favorable position to cure rapidly, the other factors necessary in the cure are not to be forgotten. This is a great mistake that is so often made, and disastrous results often follow neglect of this advice. It is particularly true of patients because they tend to place their entire reliance upon any special procedure and invariably start to work too soon. We see this is the tendency in physicians who advocate a return to work within three months or less, after pneumothorax has been induced. The question may then be fairly asked as to what guide we should follow in controlling the increase of exercise of these apparently normal patients. It has been our practice *not to permit any pneumothorax patient to return to work under one year after the induction of the treatment*. Tuberculosis is a very treacherous disease, and it is much safer to keep the patient resting a month or two longer than necessary than to take any chances of a breakdown. The average pneumothorax patient is usually able to do part time work in his second year of treatment, and full time in his third year. It is generally agreed that a lung should be kept collapsed for a period of not less than three years. The fibrosis is not sufficiently strong to permit a reexpansion under that time. Most men prefer to expand the lung somewhere between the third and fifth year.

Sedimentation Test—I have come to place more and more reliance upon the *blood sedimentation test*. This is, I believe, the most delicate test we have of tuberculous activity. In patients who are up to their normal weight, have no fever, cough, or expectoration, and who feel well and look well, and in whom the physical ex-

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The Treatment of Tuberculosis in the Home*

A PAPER on this subject can scarcely be expected to offer a great deal that has not already appeared in

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the literature because, aside from rapid advances in surgical collapse, there has been no recent new treatment advanced for pulmonary tuberculosis. Hygienic treatment is still the chief savior offered the millions suffering from this disease. However, a symposium on tuberculosis would not be complete without a discussion of home treatment, for, after all, the vast majority of these cases must still be treated in the home. Perhaps a review of the situation will stimulate our efforts toward eradication of a disease with the third highest mortality rate in this state.

Let it be understood that I do not believe that home treatment is the ideal treatment for this disease. It is merely a necessary substitute for sanatorium care and no substitute can be as good as the original article. Our economic condition is such that we must be content to care for a contagious disease without adequate isolation because there are insufficient beds in sanatoria or hospitals to provide proper segregation of the open cases. There are many champions of home treatment who contend that patients get well just as readily at home as anywhere, but these men fail to consider the public health menace provided while a great many of these patients are living at home. Can we, as physicians, feel perfectly safe in leaving a patient with open tuberculosis in contact with his family and friends, to a greater or lesser degree, for the necessarily long time required to bring about a cure? I think not.

There are some other disadvantages of home care which do not bear directly on the public health problem, but which should be discussed in passing. Of these

probably the most serious is the distracting influence of the home and family which interferes with proper rest and contentment of the patient. It is extremely difficult for a person to lie contentedly in bed while the rest of his world goes marching on. If he were among a group marching towards the same goal his progress would be more rapid. Furthermore, he would learn from the experience and errors of others. Another disadvantage is that home treatment offers a fertile field for patent medicines, quack cures, diet cures, and other exploitation schemes preying upon the sick. It is also often impossible to provide the correct diet in the home.

The major considerations of home treatment are (1) Rest regime, (2) diet, (3) adequate methods of segregation, (4) proper environment and accommodations, (5) medical supervision, (6) medication.

Rest—As Flinn has stated, rest is the only specific treatment for pulmonary tuberculosis (1). In general the more completely a patient rests, mentally and physically, the more quickly will he be cured. A definite schedule must be given the patient. At the beginning of the treatment, even in the incipient case, absolute bed rest with bathroom privileges only should be instituted. This complete bed rest may necessarily be prolonged over a period of months, depending on the progress made. As the symptoms and physical signs improve, concessions are made slowly. The patient is allowed to sit up in a comfortable chair for fifteen minutes once or twice daily, the time to be gradually increased to one hour before the patient is allowed to walk about the house or venture off the porch.

Walking is the severest form of exercise allowed for many months, and it must be very gradually increased, the patient being very careful not to tire himself at

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any time. The pulse, temperature, and general reactions must be closely watched during these periods of graduated exercise, and any untoward symptom should be the signal to go backward rather than forward.

During all of these stages a definite rest schedule must be adhered to. A day's routine should run on the following schedule. At 6:45 the patient should arise and drink one or two glasses of water, warm or tap water. He should never be permitted to sleep through breakfast time. Breakfast should be served at 7:30, followed by a quiet hour in bed, with no reading or visitors. Lunch may be served at 12:30, followed by another absolute rest period of at least two hours in length, supper at 6:00, and the patient should retire by 9:00 o'clock.

Visitors should be restricted, particularly in febrile cases, for talking in excess is detrimental exercise. Reading should be moderate and the literature should be of such a nature that mental activity is not greatly increased. The patient should have bed baths if extremely weak or exhibiting a high fever. Baths are weakening to the sick and should be limited to two weekly.

Diet—It is not sufficient to suggest a well balanced diet, for even with magazine and radio advertising the average person really does not know what makes up a well balanced diet. It is much better to write out a diet, with the patient suggesting foods that he prefers. All food should be prepared as simply as possible and yet be appetizing. Highly seasoned and fried foods are not to be sanctioned. Unless the patient is acutely ill or for any other reason is unable to assimilate a normal meal, it is not advisable to prescribe nourishment between meals. Six to eight glasses of water daily are essential. A quart of milk daily should be taken with meals. Raw eggs should not be a part of the diet. Regular hours for meals should be stressed. It is important that the physician should occasionally check up on the diet and make any changes and suggestions necessary.

Segregation—At the outset the purpose, importance, and methods of segregation should be thoroughly explained to the patient and to the family, for it is through their co-operation that this program can succeed. The patient must have a room or porch to himself, which is well ventilated but not cold. Children should not be allowed to enter the sick room under any circumstances. All dishes, utensils, and bed clothes must be boiled and kept separate from those used by the rest of the family.

The co-operation of the patient in this program is naturally essential. He must be taught to cover his mouth with tissues when he coughs or sneezes, and to expectorate in tissues or sputum cups. The tissues and cups are to be destroyed by burning daily. If possible he should have a private bath, but if this is impossible, it is up to him to be extremely careful in the common bath—to carefully clean up after himself. The person of average intelligence can learn quickly and is certainly not anxious to spread his disease, but it is necessary that the physician repeatedly remind him not to become negligent.

Environment—Toomey wisely wrote that "Few patients possess sufficient self-control and the requisite degree of self-denial to carry out a protracted regime amidst the distracting influence of the home, and few friends possess the judgment to associate with patients who are attempting to carry out such a program and afford them the moral support which is needed (2)." He might well have included the family.

The influence of the family and friends should be of the happy, hopeful type which radiates cheerfulness and confidence, and never shows worry or excitement over the patient's condition. These things must be impressed upon the family. Their co-operation in this connection more frequently than not turns the balance towards recovery. To this end, also, the accommodations of the sick room must be attractive, cheerful, and, of course, clean. It is not necessary to exist in a barren room with four staring walls and a falling ceiling to get

well from tuberculosis

Medical Supervision—The average tuberculous individual is emotionally as well as physically sick. Uncertainty and worry are two ills which cause restlessness and discouragement, and they must be allayed before the patient can get the most out of his rest regime. Therefore, aside from the general supervision of the case and the actual treatment, the physician must continually build up the morale of the patient and prevent his becoming discouraged. Cheerfulness and confidence must be the major virtues of the attending physician. After the diagnosis is made he must carefully explain the patient's condition, the requisites of a cure, and the probable outcome. He must explain why it is impossible to predict accurately when the patient will recover and be able to return to a normal plan of living. The family must be taken into the physician's confidence. One cannot be too patient in this important phase of the tuberculosis problem.

After treatment has been instituted the physician should make regular frequent visits to the bedside. Examination should be made at regular intervals and the course of the disease carefully watched. A record of the temperature and pulse should be kept for the physician's examination at each visit.

Medication—Bed rest is the most important "drug" in this disease. It is both a cough sedative and an antipyretic. Occasionally a mild cough syrup may be necessary, particularly at night. Opiates should be reserved for hemorrhage coughs only. Mild cathartics are sometimes necessary, but mineral oil preparations should not be used. Tonics and digestants have a very important use in many cases. A combination of dilute hydrochloric acid and pepsin taken with meals is frequently beneficial, especially in the markedly debilitated patient.

Intravenous injections of calcium preparations such as calcium cacodylate, calcium gluconate, or calcium chloride, alternating with similar injections of an iron and copper mixture, seem to be of value.

Calcium by mouth may be substituted if preferred. Calcium is particularly indicated in hemorrhage cases.

In the properly selected case, tuberculin is of value, but because it is a two-edged sword its use had better be left to the physician who has had experience with it.

In general, the more closely the regime approximates sanatorium treatment the better the results. Unfortunately this approximation is usually not very close.

Economic Phase—Before closing may I discuss the economic problem which I believe faces the medical profession regarding this disease? Tuberculosis is costing the public entirely too much in mortality, in time, and in money. The wealthy person is, of course, not a problem. Even people of moderate means are able to enter sanatoria or a rest home for their treatment. But what of the indigent class? County sanatoria and state sanatoria, in most cases, are required by antiquated laws to accept only incipient cases for treatment. The purpose naturally is to take only patients who will be cured in a short time and to prevent the institution from becoming a haven for incurables. However, as a public health measure this method is practically useless. The cough ridden "open case," who is dangerous to his associates, is refused admittance and allowed to spread his disease, although in many instances he could be cured if he could receive hospitalization. The working man faces somewhat the same situation. He cannot afford hospitalization and is not eligible for entrance to municipal institutions because he is not an indigent. Is it any wonder that he wants health insurance? Of all the diseases conducive to State medicine, tuberculosis is probably the greatest, and unless physicians provide much more adequate care and show better results in their combat with this disease we will soon have state medicine. Adequate segregation of at least the open case is the only procedure that will get these results.

Tuberculosis is a socialistic disease, the eradication of which depends upon the

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What is Accomplished in Tuberculosis Among My Own Race Here in Atlanta

THE CURTAIN rises upon scene one of the first act. It is a drama of Negro life. The picture shows one

room of a little four-room threadbare cottage on the outskirts of Atlanta. In bed lay a young woman about twenty-five years of age. Her features are sharp and drawn. A pungent aroma of strong deodorant penetrates the heavy atmosphere.

The extreme tranquility is broken every two or three minutes by a paroxysm of coughing, emanating from that frail bit of humanity lying there on the bed. After each cough, which shakes her body convulsively, she expels a mouthful of greenish, thick sputum and then she goes into a sort of tantrum of throat clearing to get out a part which has cleaved to her larynx. The viscid secretions rattled in her chest sounding like what many have called "death rattles."

Her mother, a woman well over sixty, sat in a chair beside the bed. On a small nearby table was an assortment of medicine in bottles of all sizes and descriptions. She was reading from a pamphlet given her by the tuberculosis clinic.

"Mother," said her daughter Mary, "Why must I stay here in bed? I feel well enough to get up. I feel that I will lose my strength by staying in bed all of the time."

"It reads here, Mary," said the mother, "to rest as much as you can. Maybe you've been needing a rest for a long time. Now is the time to take it. Stay in bed twenty-four hours every day. Rest, strict rest, is your main hope. Stay in bed until your doctor says you can be up." "Mother," she said, "I do not feel that I will ever be well again. I believe I waited too long before going to the doctor. You remember when I had that side pleurisy in college before graduation year? I can just recall that my roommate kept up a bad cough, and she is now down with tuberculosis. I should have gone to the doctor then

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and had an examination."

The little mother merely raised her head in acknowledgment of this latest

deduction by her daughter. What did she know about scientific diagnosis and modern treatment for T Bs? She spoke softly "it must be the Lord's will."

Mary was right. The clinic doctor had said her lungs looked on the x-ray picture, as if bits of cotton had been stuffed into them. There were large circles in the tops of both lungs, which looked like huge signet rings. They had recommended that she go to the sanatorium but it takes months to be accepted there. Besides why leave all that is near and dear to one, when near the end?

These wrinkled knuckles were washed bare to send three children to college. One sister dead, another across the hall sick. I glanced about the room at a table laden with school books and up to the walls, where a dozen diplomas or teacher's certificates hung. I thought of the lines "the moving finger writes and having writ moves on." It must have been a reminiscence of my college days—a selection from the Rubaiyat taken from Omar Khayyam. Tragically enough, having witnessed the above spectacle between a loving mother and daughter, I felt dejected.

Faith takes on renewed courage at the humbleness and servility of this Negro mother, in caring for a sick one of her brood. The next Sunday's paper carried her obituary on the last page. "The friends and relatives of Miss X are invited to attend her funeral at Tanner's Chapel." Pastor Brown spoke beautiful words over the inert form, draped beneath a bed of flowers. He said, "it is the will of God."

In this bed to grave episode, I have carried the story further than usual for a point. We who read death statistics are prone to pass over the fact, that so ma

Negroes died with tuberculosis, as sort of arithmetical figures rather than to think in terms of human suffering. We can always readily understand when death strikes into our immediate family, then we want to move heaven and earth to right all of the wrongs.

Bear with me a minute while I cite you. Taking 1930 as a sample year. In the city of Atlanta 190 Negroes died from tuberculosis. Since the Negro population of Atlanta is about one-third that of the general population, this means the Negro death rate from tuberculosis was 210.9 per 100,000. Living side by side with white people, we are prone to make comparisons. During this same year 80 white people died from tuberculosis in Atlanta or at the rate of 44.4 per 100,000 population. The colored rate was four times the white rate in this disease.

I shall not burden you with more figures upon this point. Keep in mind, however, that since 1923 when vital statistics became available in Georgia, that the Negro death rate has fluctuated mildly downwards, with an occasional yearly increase, while the white rate has steadily decreased without interruption. The state statistician made an observation that at the present rate of decrease, all factors remaining equal, it would take 100 years for the Negro death rate to fall to the level of the present white rate.

At Battle Hill Sanatorium there are 58 beds available to Negro patients and at Alto there are 85 beds. Comparatively speaking there are 171 beds at Battle Hill, the County Sanatorium, for whites and 300 at Alto, the State Sanatorium. So far as general hospitalization goes, of the 8000 hospital beds in and around Atlanta only 300 are available to Negro patients. Negro doctors may practice medicine and surgery in one private hospital, having a fifteen bed capacity.

The next scene opens in a clinic room of the Atlanta Tuberculosis Association, where rightfully this story begins. There are two patients on the tables, with two pneumothorax machines, being operated by Negro physicians. A third doctor

seives as secretary to record the findings.

Dr. Lang: Why is pneumothorax advised in a great number of cases instead of other methods of collapse therapy?

Dr. Thomas: Artificial pneumothorax has many advantages over other methods. Some of these are: safety, simplicity, control of the collapse, control of hemorrhage. It is a reversible procedure (all can be taken out as well as admitted to the pleural cavity). It can be used in the treatment of early uni-lateral lesions, bilateral partial collapse and can be used in conjunction with surgical procedures.

Dr. Billings: What are some of the contra-indications to its use?

Dr. Thomas: Whereas I do not believe that there are many if any contra-indications to its use in pulmonary tuberculosis, we may encounter several disadvantages such as: incompleteness of collapse due to stiff walled cavities or pleural adhesions, an embolism, shifting of the mediastinum, pulmonary heima, incidence of tuberculous empyema, inability of the lung to re-expand after pleural thickening and fibrotic contraction.

Dr. Harper: Would you continue a pneumothorax if it failed to close a cavity?

Dr. Thomas: To continue artificial pneumothorax in a patient who has an unsuccessful collapse is to hasten him to his grave. The collapse should be discontinued if phrenectomy used in conjunction with the pneumothorax fails to effect the desired results.

Before a patient is given any treatment, if he has had previous refills, note is made and read aloud of his last manometer readings and the degree of collapse, secured to date, also the amount of air taken each time. After finishing his treatment the patient is led into a dark room and fluoroscoped. I might say before a case is started a conference is held over his x-ray picture to decide which form of compression treatment is suitable for him. This is our pneumothorax clinic.

Downstairs is another examination room where all patients are gone over

and diagnosed or prescribed for according to their indications. A doctor gives skin tests to those who first come in, in order to screen out suspected cases of tuberculosis. His x-ray film is brought in, if he has been recommended for such and comparisons are made.

In five years 3,218 Negro patients have been examined here and 727 patients have been diagnosed with tuberculosis. 282 or 38 per cent have been sent to sanatoria. In the pneumo clinics 13 Negro patients have received compression treatment. Five Negro physicians report regularly now to do this work which was started in 1932 and for the first ten months of 1935 have held 51 pneumothorax clinics. A fair estimation of results is that about one third have received satisfactory compression (lungs have collapsed the diseased parts or closed cavities) while a third have been partially benefited. Still another third are in the unfavorable class. This clinic is operated on an ambulatory basis and selections are not made of ideal cases alone but rather if we think we can give assistance at all. Three cases have been sent to Grady hospital for phrenic nerve operations.

Outside of the clinic in private practice we have carried on compression treatment in 15 patients with about the same comparative results shown in the clinic. These patients are also treated on an ambulatory basis. I recall one patient who has a successful collapse and who has never stopped doing janitorial work except for a few days, when the first treatments were made. Some of these patients start off paying for their treatments but eventually we have to send most of them into the clinic or to sanatoria. We have only hoped to bridge in the time between diagnosis and the time for sanatorium admission but due to the slow sanatorium turnover, I suspect we shall have them permanently on our hands, unless additional accommodations are set up in the State Sanatoria.

We are doing educational work by giving lectures and illustrations before clubs and schools. We contribute regularly an

article to the Negro press, written in the language of the laity, on tuberculosis and its prevalence. Spurred on by an offer of the National Tuberculosis Association, to give free purified protein derivative for skin testing Negro college students, one of our doctors has skin tested the students at Morris Brown University.

We have assisted the FERA in its examination of at least 20,000 Negro women to determine eligibility for employment, as well as to skin test 50 children in the government nursery schools. We found some active cases of tuberculosis and many suspects, who were directed to the chest clinic at Grady or to the A T A for substantiation of diagnosis.

I believe that this contribution of the Negro doctors will help towards lowering the death rate in 1935 from tuberculosis in Atlanta among Negroes. Our only hope is that we might be able to enlarge our program, realizing that in a large city there can be no effective control over such a scattered group of sick persons. The greatest factors we have to depend upon is the skill of the doctors and the accessibility of the patient to the clinic.

We recommend for improvement in 1936 the following items:

The addition of 100 beds for colored cases to Battle Hill and to Alto.

The erection of custodial institutions to take care of the hopelessly sick patients from all diseases.

The immediate opening of the children's ward at Battle Hill which has already been built and equipped.

That there be provided a place for Negro physicians to do chest surgery either at Battle Hill or the City Hospital.

To not only facilitate the training of Negro doctors and nurses in the City and County or State institutions but arrange for the appointment of the best suited of these professional people, to appointments as public health officers. In this respect they might give the advantage of their training to the masses of Negroes with mutual benefit of both citizens and the doctors in mind.

The Importance of Mouth Hygiene in the Treatment of Diseases of the Chest

THE ORAL cavity being the port of entry for all food used by the human body, and with most bacteria that enter the body through this channel, it becomes an important factor to give some heed to the importance of mouth hygiene in the treatment of disease and particularly those diseases that have to do with the respiratory tract.

The original theory that infection was supposed to extend directly from the teeth to the source of infection, by means of aspiration and gravity, has been placed in a secondary role and now it is conceded that the infection in most cases is carried to different parts of the body by circulation, particularly the lymphatics. In my opinion, both of these theories are equally important, although it is proven that most diseases caused by infection are carried through the blood stream.

Food taken into the body through the mouth is mixed with saliva, which carries with it any bacteria that maybe in the mouth at the time. It is well known that the mouth is filled with bacteria almost from the minute of birth. Most of these bacteria are harmless and many of them are necessary and beneficial, but bacteria like Vincent's spirilla and the tubercle bacillus are pathogenic and if prevalent in any large amounts do untold damage to the body.

A patient suffering from tuberculosis or any other chest condition, or disease of the respiratory tract, with which we are at present concerned, has enough to fight off this condition without added load swallowing of virulent bacteria with every mouthful of food, or having them absorbed through the lymphatics and carried to the affected parts. We could go on to show how these bacteria cause many of the infectious diseases of the body, but in this paper we will limit the subject

to the chest and respiratory tract.

The toxic symptoms of oral infections are so similar to those of tuberculosis, that they are often interpreted as due to tuberculosis among the tuberculous. This is because the clinical manifestations are not easily distinguished from the clinical symptoms of tuberculosis.

In the diagnosis of pulmonary disease, lesions of the upper respiratory tract, particularly those associated with "Dead Teeth" should be kept in mind. Interthoracic disease secondary to periodontal infection may closely simulate pulmonary tuberculosis. Recognition of lung abscess consequent to dental caries and adequate treatment thereof, yield highly favorable results.

In the matter of diagnosis, one must be very careful and sure of their findings. At autopsy, it is reported that many cases of pulmonary disease associated with dental lesions, are often missed clinically and are frequently passed on as tuberculosis. Possibly, many of these cases could have been cured had an early, accurate diagnosis been made. This should encourage a closer relationship between internist and dentist for the benefit of the patient, especially in the treatment of tuberculosis, as most patients with pulmonary disease, which may have its origin in the oral cavity, seldom go to the dentist first.

The unfavorable conditions of the mouth making a ripe field for the invasion of bacteria, and causing them to enter the chest or respiratory tract, either by direct aspiration or through the blood stream are as follows:

- 1 Pyorrhea Alveolaris and trench mouth
- 2 Fillings with poor or rough margins
- 3 Irritating dentures and bridges
- 4 Cavities and rough edges of teeth

BY
DAVID E. JACOBS, D.D.S.*
Los Angeles, California

*Chief of staff, Dental Department, Cedars of Lebanon Hospital, Los Angeles

5 Loss of teeth causing recession of gum tissue around necks of teeth adjacent to teeth extracted

6 Lack of chewing properly because of lost teeth

7 Abscessed teeth and any special infection

It would be too lengthy to explain each of these causes in detail, but suffice it to say that any of these causes makes for an unclean mouth, with pockets filled with bacteria and which in time get into the respiratory system and lungs. To prove this point, it is shown that in hospitals where mouth prophylaxis is practised before major operations, requiring the use of a general anesthetic, the percentage of pneumonia after anesthesia is greatly reduced and in some hospitals almost negligible. This procedure is practised at the Mayo Clinic with the most favorable results. In time, this will become a routine procedure except in cases of emergency operations. Most Class A Dental Schools require hospital internship before graduation which will in time lead to this practice of mouth prophylaxis before anesthesia and hence, greatly reduce pneumonia after anesthesia. It is easy to understand that bacteria can be drawn into the chest and respiratory tract during general anesthesia of long duration.

In a survey of institutions treating respiratory diseases, seven hundred patients are cared for by a visiting dentist. He reports, "when patients enter the institution, almost all of them are dental 'cripples,' most of them suffering from

pyorrhea and trench mouth." "Out of one hundred and sixty four patients examined at one institution, thirty five or twenty percent had trench mouth." After a general prophylaxis, with the extraction of the very bad teeth and with instructions as to the care of their teeth, these patients showed immediate improvement in their general condition.

Seventy nine percent of the American people do not see a dentist at any time. Of the remaining twenty one percent, a large proportion do not see a dentist except in cases of emergency (a tooth-ache, which is generally followed by extraction).

The proportion of people who see their dentist twice a year and brush their teeth twice a day, is still very small, which should put the physician on his guard in treating some of the diseases we have mentioned.

Summary

1 A closer relationship between physician and dentist is necessary for an early, accurate diagnosis.

2 Bronchitis, asthma, tracheal stenosis, embolic pneumonia, fusiform and spinallary of the lung, tuberculosis, tonsillitis and laryngitis may have a direct relationship to dental sepsis.

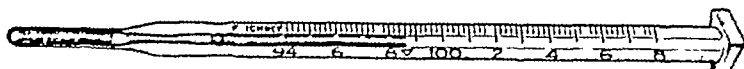
3 X-ray of the oral cavity, the elimination of all dead teeth and all signs of infection is advised as soon as practical.

4 A thorough prophylaxis is very necessary as soon as possible.

5 The co-operation of the patient in the matter of dental hygiene cannot be stressed too strongly.

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Tuberculosis of the Trachea as A Cause of Death

IN REPORTING deaths as due to tuberculosis reference is rarely, if ever, made to involvement of the trachea as being the immediate cause, therefore, just how often this complication is so responsible, we have no way of knowing. I have observed quite a number of such deaths, upon some of whom an autopsy has been obtained.

At autopsy on our tuberculous patients, unless a special request is made, the trachea is not usually investigated, and, even though this complication is found, the pathologist, aware or not of the clinical symptoms which preceded death, would hardly make note of it as being the immediate cause of death.

These cases usually have some involvement in the larynx, but, in the cases I have seen, this has been comparatively small and would not lead you to suspect trouble below.

The diagnosis is certainly not often made during routine examinations of head and throat. Bronchoscopic examination is not, of course, indicated in all our tuberculous patients, but there are many in whom it is not only permissible, but advisable.

The diagnosis is certainly not often made during routine examinations of head and throat. Bronchoscopic examination is not, of course, indicated in all our tuberculous patients, but there are many in whom it is not only permissible, but advisable.

Should the laryngologist, at his usual examination of the larynx made by the indirect method, find a case showing heavy viscid secretions clinging to the walls below the cords, he should advise such an examination.

Probably long before such a discovery, the medical man in charge should have been suspicious of this complication on account of wheezy respiration, both inspiratory and expiratory, and more or less continuous, of mild or severe attacks of dyspnoea relieved only by the raising, after much physical effort, of heavy, tenacious secretions, and should have requested this examination. These cases die of suffocation as a result of their inability to expel the secretions which form in, and cling to, the diseased portions of the trachea—plus

that which usually must be raised from the lungs—and it is not pleasant to witness such a death.

The diagnosis of tracheal involvement is too rarely made, or even suspected, and the patient dies and is buried with the simple diagnosis—"Tuberculosis of the lungs", with, probably, "Tuberculosis of the larynx" as a contributing cause.

Because of our hesitancy in using the bronchoscope, when a diagnosis of this complication is made, it is made too late to be of any help in our management of the case.

The question might be asked, "What can be done for these cases, perchance discovered fairly early?"

For such a question I may not have a ready response. However, I would have the satisfaction of making the diagnosis, I would do something, rather than nothing, I would not simply treat these cases as "Asthmatics".

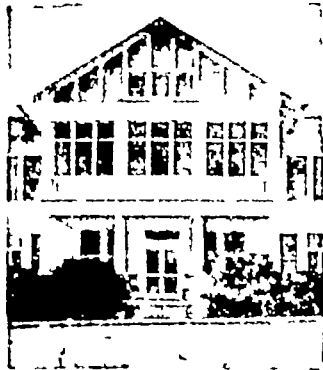
I would know the cause and location of the constriction to breathing, and I would eliminate, or discover, other causes than Tuberculosis, be they simple or malignant.

I might also, locate the cause of obscure hemoptysis, and I would be prepared to act promptly whenever distressing symptoms should arise.

By discovery of this complication I would prevent a patient, who might otherwise be considered a suitable one, from being exposed to a thorocoplastic operation, thereby protecting patient and surgeon from taking an unnecessary and hopeless risk.

In the cases that have come to autopsy the involvement, and extension, seemed to be from below upward.

In one case there was found a general infiltration and thickening, rather evenly distributed, of the entire lower two-thirds of the tracheal wall and upper portion of left main bronchus, with only superficial ulcerations, the calibre of the trachea being reduced to the size of a lead pencil.



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A suppurative mediastinal gland had been suspected in this case, but was not found. She had been ill only five or six months, and her lung condition was not extensive.

The first symptoms of disease in this patient were those of a laryngitis. This case may serve as an example of an acutely progressive one.

In another case, an entirely different condition was found. This patient had far-advanced disease in her right lung, with only slight involvement in her left, her right kidney had been removed and she had a right pharyngectomy. In her case the calibre of the trachea was not as greatly reduced, but there was much deformity from old, extensive sluggish and weeping ulcerations.

This patient suffocated on account of

not being able to raise her own secretions, without having developed trouble in the lungs due to obstruction.

Her larynx showed an old inactive involvement, but there was no edema.

Dr. Chevalier Jackson, I believe, is given credit for expressing the very important truth—"All is not asthma that wheezes."

In our cases of Tuberculosis showing symptoms of obstruction to breathing which cannot be accounted for in the lungs, as in those with some atelectasis or bronchiectasis, or other conditions favoring stagnation of secretions, we should always bear in mind the possibility of a tracheal involvement, and should not hesitate to use the bronchoscope.

The fact that there is some involvement in the larynx should not deter us, if more important contra-indications are not also present.

When obstruction to breathing is in the larynx, there is always present a pathognomonic sign—marked supra-sternal retraction, which is noticeable by its absence in these cases.

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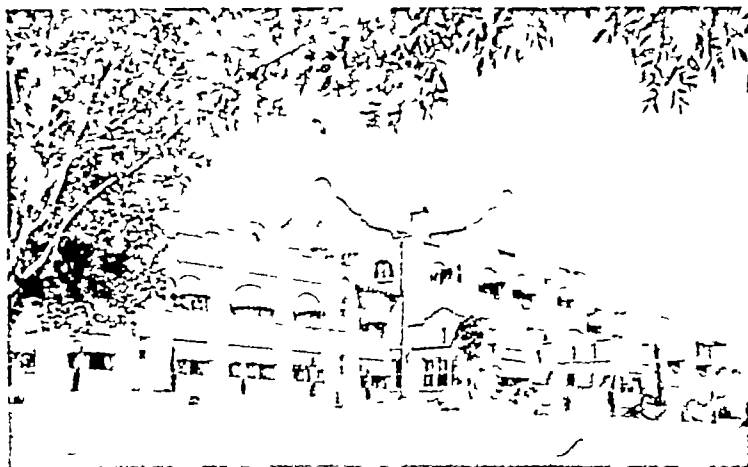
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ABSTRACTS

SIMONS, DEWIN J. and SIMONS, JOHN B.
Problems of the General Practitioner in Tuberculosis. *American Review of Tuberculosis*, 30: 593-598 (Nov.) 1934

Since December 17, 1929, 30 cases of pulmonary tuberculosis have been encountered in a general practice centered about Swainville, Morrison County, Minnesota. Eighteen of these were discovered in the routine of practice, 12, through efforts to trace the others epidemiologically. Various questions have arisen in this work, which are believed to be not peculiar to any one practice but to typify the difficulties of tuberculosis work in all general practices. The purpose of this paper is to discuss these problems in the hope that their elucidation will assist in the fight against the disease in rural districts.

Both the diagnosis and the treatment of the malady are fraught with obstacles and pitfalls for the rural physician. Diagnostic difficulties are undoubtedly of first importance. These may be divided into the problems presented by the atypical individual case and those concerned with the epidemiology of the affliction. Questions of correct therapeutics for rural patients also must be given attention if the disease is to be adequately controlled.

Attention was first directed to the problem of diagnosis of tuberculosis by successive epidemics of measles and pertussis and the subsequent death of two patients from tuberculosis meningitis. It became apparent that even the most detailed history and careful physical examination would not disclose every case of tuberculosis. In addition, repeated sputum examinations were made, basal-metabolism tests were performed when needed and a daily temperature record with thermometer readings taken four times a day over a 10 to 14-day period was required.

However, it was not until the Mantoux and Piquet tests were added to the diagnostic regimen that actual progress became noticeable. Each patient reacting positively to tuberculin has been subjected to roentgenographic study. All x-ray

plates have been interpreted by either a roentgenologist or someone specializing in tuberculosis. These two phases of the diagnostic scheme have furnished a solution for the problems presented by the individual atypical cases. Until the adoption of the use of tuberculin in diagnosis a sense of insecurity and inadequacy was unavoidable. After tuberculin was added to the diagnostic armamentarium many of the questionable cases were found unmistakably to be one form or another of tuberculosis. More general use of the tuberculin tests by general and rural practitioners will go far in solving diagnostic difficulties in rural districts.

In general practice outside the cities the epidemiology of tuberculosis constitutes a real problem, the solution of which is dependent upon the interest and cooperation of the rural physician. Here again tuberculin tests offer the first means of approach. Whenever an individual is found to be tuberculous through use of the diagnostic schedule previously given, every member of the patient's family is tested with tuberculin. After this is done other contacts from whom the patient may have become infected or to whom it may have been spread are tested. The family's milk supply is, when necessary and possible, subjected to tuberculin tests. Other possible sources of infection or channels of dissemination are also investigated. Thus, then, tuberculin-testing provides the first means of epidemiologic diagnosis.

Although tuberculin is indispensable to the unfailing diagnosis of tuberculosis in rural districts, its use introduces one of the greatest dangers in recognition of the disease. This is involved in the interpretation of the roentgenogram. It is felt that only those general practitioners who have had special training in tuberculosis or in roentgenology should pass final judgment on films of persons suspected of the disease.

It is at this juncture that the rural physician encounters one of his great difficul-

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ties in connection with the problem. The patient is reluctant to incur the expense of the Mantoux test and x-ray study, and when the doctor mentions the additional fee for interpretation, the patient often refuses to let the film be taken and also assumes that the local physician is culpably ignorant. This problem could be solved by the designation of some individual or institution by whom or where accurate interpretation of thoracic film of tuberculosis suspects could be obtained without cost to the patient or rural practitioner. Since this would overcome one of the principal obstacles in correct diagnosis of tuberculosis in rural patients, the expense would be justified eventually by the advancement of the anti-tuberculosis campaign which it would aid.

Therapeutic difficulties are less clearly

defined. Still, proper management of cases found in rural practice would unquestionably reduce both the incidence of, and mortality from the disease. The care of the tuberculous patient in the rural home holds forth little promise of desirable results. This is not due to the treatment advised but to the treatment actually followed by the patient. Minor variations in one phase or another could possibly be well borne, but each deviation soon leads to other concessions until the ultimate home treatment amounts to no treatment at all.

Solution of the financial problems depends, of course, upon either provision of sanatoria in each county or the gradual education of the public to the necessity for this form of treatment so that permission can be obtained for such care in all cases.

CASE REPORTS*

ASPERGILLOSIS

By W. Rufus Smith, M.D., Knoxville, Tenn.

Mr. S., age 45, weight 133, general appearance fair. In May, 1933, he developed a slight cough, bringing up a lump of expectoration every morning about the size of an average marble. This sputum was very tenacious and was dotted with black specks. He had some dyspnea, appetite was fair, no energy, and was losing weight. He had had a few mild night sweats at the onset.

Past history of influenza in 1919 or 1920, with a very slow recovery. No other diseases of importance.

Physical examination of all systems were negative except the chest. On the right side there was diminished expansion and slight impairment of resonance over entire chest. Breath sounds were harsh, and there were occasional dry rales in right apex. Breath sounds were markedly diminished, and a very few distant moist rales in the right base. Left chest revealed no abnormal findings.

Blood and urine revealed nothing abnormal. Six sputum examinations were negative for tubercle bacilli, but one of

two revealed some abnormal cells, which I took to be some form of fungus cells. After several cultures of sputum were made, a pure growth of *aspergillus fumigatus* was obtained.

X-ray of chest revealed small amount of fibrosis in right apex. There was considerable fibrosis with a round, infiltrated area about three inches in diameter in the right base.

Of all the literature I have been able to review, it seems that everyone is agreed on the iodides in one form or another, given orally or intravenously, and to be given in large daily doses. This is not specific, though it does cause marked improvement in some cases.

In discussing this case, one can readily see how easily a diagnosis of tuberculosis could have been made on the history, physical findings, and the x-ray findings. I placed this patient on the same routine as used in the treatment of tuberculosis, and gave him 45 grains of potassium iodide orally, 15 grains three times daily. Up to the present time, the patient has shown remarkable improvement in every way, being entirely free of symptoms with little or no physical findings.

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MODERN METHODS OF DIAGNOSIS AND TREATMENT

(Continued from page 13)

amination and x-ray is not much help because of the collapsed lung, the blood sedimentation test gives us a very accurate indication of the healing process. The test is very simple and consists of reading the sedimentation of a column of citrated blood in millimeters of one hour.

This brief resume of some of the modern methods in Tuberculosis, shows, I think, that the diagnosis and treatment has advanced rapidly in the last few years. The newer procedure in treatment may in

all fairness be compared to the discovery of Insulin for Diabetes and liver extract for Primary Anaemia. The public is beginning to realize the value of these measures. The treatment of our Tuberculous patient is not the simple matter it was ten or fifteen years ago when it was just a case of putting him to bed and keeping him there. We must always consider our tuberculous patients carefully as a possible candidate for one of these newer methods of treatment.

THE TREATMENT OF TUBERCULOSIS IN THE HOME

(Continued from page 16)

combined efforts of organized medicine, the public health service, and the government. Educational programs sponsored by these agencies have served, and will continue to serve, a great purpose, but they have accomplished nearly as much as is possible in most states. The only logical course to take in the future is to provide means for the scientific segregation and treatment of every patient suffering from this disease. If such segregation were made compulsory as in other contagious and infectious diseases, and could be maintained through one generation, the tuberculosis problem would resolve itself into

no problem at all. Shall organized medicine perfect a plan or shall we let the government do it?

SUMMARY

1 Home treatment is merely a substitute for sanatorium treatment, made necessary by economic conditions.

2 The disadvantages of treatment in the home are pointed out.

3 A suggested regime for home care is given.

REFERENCES

- 1 Flinn John W. The Specific Treatment of Pulmonary Tuberculosis, Southwestern Med 15 299-306 (July) 1931
- 2 Toomer W. A. Home Treatment of Tuberculosis. New Orleans M & S J 84 357-362 (Nov) 1931

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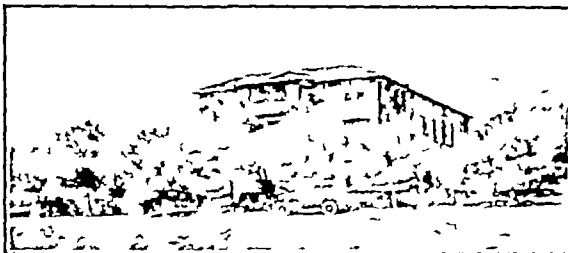
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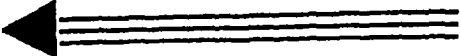
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MANAGING EDITOR

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THE patients of Devitt's Camp unite in wishing all physicians and readers of this magazine a most Successful and Happy New Year

We who are afflicted with tuberculosis, make bold to send you a message—we urge you to redouble your efforts in the fight against tuberculosis in your community Too much emphasis cannot be placed upon the prevention of this disease nor upon its early discovery Medical science has devised means of determining the presence of tuberculosis not only in adults but particularly in children Where there is the least doubt do not hesitate to use the roentgen ray The early diagnosis may mean, perhaps, the patient's life Much has been done—*much more can be done* Your community needs *your* help and we know that you will rise to the occasion and give it unselfishly

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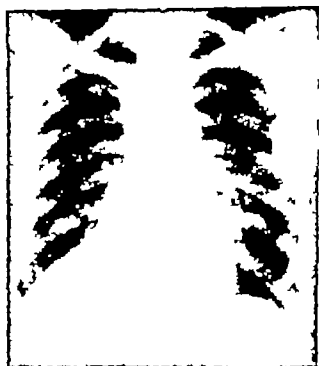
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DISEASES OF THE CHEST

Official Organ of the Federation of American Sanatoria
Editorial offices 1018 Mills Building, El Paso, Texas
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New Year Greetings

BY

WILLIAM DEVITT, *President*

FEDERATION OF AMERICAN SANATORIA

I want to extend to the members of the Federation of American Sanatoria my congratulations for the very wonderful progress that has been made by *your* organization

Starting with the meeting in Albuquerque on August 10, 1935, it was quite a problem to launch a *new* national medical society. The aim of the Association is such, however, that it appeals to all physicians. I feel that we have a great future.

Some of us have realized for years, that if tuberculosis is to be eliminated, it must be done through the busy practitioner. We believe *our* organization is the *only* one whose principal aim is to bring this about. Some people have felt there was no need for another medical society. It is true their name is *legion*. However, they are all interested in their own line of work. We believe, if we can keep up our present rate of progress for *five* years, we will have done much to bring tuberculosis under *control*. We must remember it is *our* problem. Surely, any disease which takes such a toll of lives between the ages of fifteen and thirty-five, should be a national problem.

We feel it is not enough to educate the public, that we should go farther back and make an effort to bring before the *physicians* of the United States the important part *they* must play in this great work.

This will be done by our Educational Committee, through medical meetings and through the Federation magazine DISEASES OF THE CHEST, which is already attracting much favorable attention. The editors of this publication are making a strong effort to publish articles that are not ultra-scientific. I hear many favorable comments on their good work.

It is planned to have each State bring before the bedside physician the *importance* of their cooperation.

The Economic Committee is swinging into its stride, contacting industrial organizations, emphasizing the importance of placing their employees under treatment at the *earliest possible* moment.

All the other committees are getting under way, and by the time this goes to press, I am sure all will be functioning.

Each of us must realize the importance of carrying *our* message. It must cover the entire country until tuberculosis no longer is the dreaded menace.

We would be glad to have any suggestions from any of our readers, looking forward to making the Federation of American Sanatoria of more service and the DISEASES OF THE CHEST a better magazine.

The Federation extends to you all, many wishes for a better NEW YEAR.

Season's Greetings The Editorial Board of DISEASES OF THE CHEST also extends the Season's Greetings to all of our readers. We have resolved to continue what we believe an intelligent fight against tuberculosis. We feel that by emphasizing especially, early diagnosis and the segregation of the open case, much can be accomplished. We have resolved to present in the pages of DISEASES OF THE CHEST, such simple readable articles by distinguished Tuberculosis Specialists that will be helpful to all physicians in the general practice of medicine.

We have also resolved to concentrate our efforts in the campaign against tuberculosis by offering such messages through the pages of this journal that will tend to keep the busy bed-side physician "Tuberculosis Minded." It is our opinion that many more cases of tuberculosis will be discovered early if our messages are put before the profession at large with an appeal for their co-operation in the effort to absolutely control the tuberculosis situation.

The Editorial Board welcomes at all times suggestions, case reports, articles and queries. Your Board needs your help in making DISEASES OF THE CHEST useful in its intended field. C M H

Congratulations THE COUNCIL on Journal of A M A Medical Education and Hospitals of the American Medical Association is to be congratulated upon the special "Tuberculosis Number" of their journal. Our congratulations to the director of the survey, Doctor Frijof H. Aiestad, to the editor of the journal and to the staff of statisticians and field workers.

This is the most exhaustive survey yet attempted in the tuberculosis field and it affords a real study to those of us who are in daily touch with tuberculosis problems. The charts and the explanations accompanying them, simplifies the task of comparing a large mass of figures and we can well understand that two years was required to collect, correlate and edit

this massive amount of information. The editors of DISEASES OF THE CHEST will discuss various phases of this survey from time to time.

We urge the readers of DISEASES OF THE CHEST to get a copy of this very splendid "Tuberculosis Number" of the Journal of the American Medical Association and to all of the organizations, associations, their officials and their staffs, who in any way had a part in the compilation of this report, we say "You may be proud of a task well done." M K

Facts and Figures AFTER STUDYING the figures listed in the charts of the survey conducted by the Council on Medical Education and Hospitals of the American Medical Association Journal of December 7th, the "Tuberculosis Number," several interesting comparisons present themselves for discussion.

We find that in institutions supported by the tax-payers of this country, 1544 full pay and 4678 part pay patients are being cared for, a total of 6222 patients. These same tax-supported institutions report a waiting list of 8365 patients.

On the other side of the fence we see a quite different picture.

In the private sanatoria of this country, we have a report of 4964 patients cared for free, 2863 who are able to pay for part care, a total of 7827 patients and 3678 patients who are paying for full care. They also report 3788 vacant beds.

Study these figures for a moment and permit us to ask several pertinent questions to you physicians who are still engaged in the private practice of medicine.

Why should tax-supported institutions accept pay patients and require indigent patients, who are in need of those beds to remain on a waiting list?

Why should private sanatoria care for patients free, when municipal, county and state institutions are making a charge to the patient?

Why not fill the 3788 vacant beds in the private sanatoria with the 4678 patients who are able to pay in part or in

full, and who are now occupying beds in tax-supported institutions? Why not release those beds to care for the open indigent case of tuberculosis?

Is it possible that the tax-supported, municipal, county and state sanatoria are practising private medicine and compelling the private sanatoria to take care of the indigent patients?

The above statistics deserve the careful study and attention not only of every physician but of every tax-payer in this country. We cannot doubt the veracity of these figures compiled by Doctor Frijof H. Arestad, director of the survey. They prove that our present system of hospitalization insofar as tuberculosis is concerned, is neither just nor adequate.

C M H

Collapse Therapy COLLAPSE THERAPY is attracting widespread attention from both the laity and the medical profession at this time.

Many general practitioners throughout the country are giving pneumothorax now and then to an occasional case of pulmonary tuberculosis, this being true, it might be wise to emphasize the contra-indications and the unfavorable factors that should be recognized when this form of collapse therapy is contemplated.

The most important contra-indications are *Marked pleural adhesions*, which can usually be established by trial. *Rigid walled cavities*. These can seldom, if ever, be compressed. *Massive involvement of both lungs*. Little or no improvement could be expected. *Old fibroid cases, markedly retracted*. The procedure is useless in such cases.

The unfavorable factors may be mentioned as follows. *First*, unusually large cavities. *Second*, presence of serious tuberculous complications. *Third*, presence of a markedly thickened pleura. *Fourth*, marked activity of the process on the better side. *Fifth*, elderly patients, over forty-five or fifty years of age. *Sixth*, marked diminution of vital capacity. *Seventh*, organic heart disease. *Eighth*, high fever. *Ninth*, extreme emaciation. *Tenth*, very

acute process or a pneumonic process. *Eleventh*, the presence of asthma, emphysema, or silicosis.

Pneumothorax is sometimes employed in non-tuberculous infections of the lungs, unfavorable factors to be considered in this instance would be bilateral bronchiectasis, acute abscess of the lung, neoplasm, silicosis, asthma, emphysema, diabetes, unless controlled by diet and insulin.

Pneumothorax has been employed in not a few cases of acute lobar pneumonia. The reports of cases are too few to give the proper evaluation at this time.

I would like to emphasize that pneumothorax is positively dangerous in abscess of the lung and can only produce improvement when the abscess is openly drained by way of a bronchus.

C M H

Circulatory Disturbances THE SYMPTOMS attributable to the circulation observed in pulmonary tuberculosis

are acceleration of the pulse in the absence of recognized cardiac lesion, changes in the heart itself including its dislocation, symptoms of resulting stasis, and, finally pulmonary hemorrhage. Increased rapidity of the pulse rate due to various causes may occur at any period during the course of the disease. It is often noted in the very early stages, even when other symptoms and physical signs are absent. The truth is that in many such instances the patient is already the subject of tubercle deposit, the evidences of this thus far having escaped detection.

C M H

NEW YEAR RESOLUTIONS

Resolved to assist in the further decline of the death rate from tuberculosis.

Resolved to make earlier diagnosis of tuberculosis.

Resolved to insist on the segregation of the open case of tuberculosis.

Resolved to subscribe to the publication "DISEASES OF THE CHEST" so as to assist in carrying forward this program.

M K

Treatment of Syphilis

Complicating Tuberculosis

IF ONE CANVASSES the literature dealing with coexistent syphilis and tuberculosis one is impressed by the discovery that those who may be presumed to know most about these two diseases are far from agreement regarding the principal medical factors involved in concomitant infection, excepting only one, namely the fact that syphilis and tuberculosis do often complicate each other. Many statistics are available showing the percentage of patients having both tuberculosis and syphilis and since both diseases are very chronic and very prevalent it is not surprising to find a high percentage of coexistence of these infections. Studies of syphilis complicating tuberculosis and the figures given are usually the result of serological examinations of patients having tuberculosis. A few recent examples of such statistics are given in Table I, below.

BY
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opinion among tuberculosis specialists for Guild and Nelson (7) in their study of 67 important

tuberculosis sanatoria having more than 20,000 patients found that 54 sanatoria made routine serological tests, while 12 applied the test only "on indication." This is a matter of some importance for as might be anticipated those institutions which applied the test routinely found four times as many cases of syphilis as did those in which the test was applied "on indication."

Since no one doubts that syphilis and tuberculosis often coexist it is appropriate to ask whether syphilis plays a part in the etiology of tuberculosis. That syphilographers and tuberculosis specialists differ among themselves is shown by the following quotations from the writings of distinguished authorities. One syphilographer states, "Tuberculosis is apt to be

TABLE I

AUTHOR	Number of Cases of Pulmonary Tuberculosis		Percentage Having Concomitant Syphilis
1 Chadwick	White	1,094	33
"	Colored	237	18.5
2 Barksdale	White veterans	9,045	22
"	Colored veterans	563	12.6
3 Gallant		1,607	21.0 Wasserman
"		358	15.0 Kahn
4 Giese and McGovern		1,154	8.6
5 Habliston and McLane		4,621	14.2
6 Horwitz		1,460	8.3
7 Guild and Nelson	White	17,348	4.1
	Colored	2,933	21.0
	Total	20,281	Total 6.5

Even as to the necessity for making serological examinations of patients having tuberculosis there is no unanimity of

activated in the presence of syphilis." Another mentions, "The fact syphilis predisposes to tuberculosis." Workers in the field of tuberculosis have the following to contribute, "Tuberculosis is particularly liable to develop on luetic soil." Another says, "At least we may infer that the

*Read before the American College of Physicians at Philadelphia April 29—May 3 1935

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presence of syphilis renders a patient more liable to the development of pulmonary tuberculosis." Still another asserts that "Syphilis, malaria and diabetes are powerful systemic infections which leave a lowered resistance" to tuberculosis. But a British writer states that in his opinion syphilitic subjects are not especially susceptible to tuberculosis, and the summary of a recent American study states, "Our evidence suggests that syphilis does not predispose to tuberculosis."

Vagueness and uncertainties becloud the very natural question as to what effect, if any, syphilis has upon the outcome of tuberculosis when these diseases coexist. Does syphilis make the prognosis more grave, less grave, or does it not affect the prognosis favorably or unfavorably?

One leading syphiologist asserts, "The association of tuberculosis and syphilis seems in some intangible manner to be of favorable import or at least not markedly unfavorable for each disease. This relationship may be disturbed by treatment." Another equally distinguished writer states, "These two chronic diseases act adversely upon each other as would be expected." While a third says, "In general the influence of intercurrent syphilis on tuberculosis is unfavorable."

A leading tuberculosis specialist points out that, "Beginning with Hunter many have maintained that there exists a certain antagonism between these two diseases, 'to the advantage of the patient.'" Another equally distinguished specialist says, "Syphilis coincident with tuberculosis has shown a decidedly unfavorable influence on the tuberculosis in direct proportion to the extent and activity of the tuberculosis."

There is a difference of opinion as to whether syphilis complicating tuberculosis should be treated. One writer advises treatment of syphilis "in all cases where the tuberculosis is non-active," another says treat syphilis "only when it dominates the clinical picture," while a third asserts that "it is obvious that treatment of the existing syphilis produces a marked improvement in the tuberculosis."

As a matter of practical fact Guild and Nelson found that one-third of all the tuberculous patients who have syphilis received no treatment whatever for their syphilis, and this difference is not based on varying stages of the two diseases concerned but upon differences in the practices of various sanatoria.

The burden of opinion seems to be that recent syphilis in the presence of active tuberculosis substantially darkens the prospects of survival, especially if no treatment or wrong treatment of syphilis is administered. But when we inquire what *kind* of treatment should be given we find ourselves in the worst dilemma of all, for syphilologists differ almost as greatly among themselves as do tuberculosis specialists.

The main drugs used in the treatment of syphilis are (a) the arsenicals, (b) bismuth, (c) mercury, and (d) the iodides. Each has its proper and important place in the treatment of syphilis and the selection of the drug will depend upon the stage of the disease and the clinical conditions of the patient in each individual case. Guild and Nelson found that some tuberculosis sanatoria use only arsphenamine, others only heavy metals, and others both arsphenamine and heavy metals. If the medical directors of tuberculosis sanatoria seek guidance from the writers of books and articles dealing with the subject of syphilis complicating tuberculosis, they will get but little assistance in deciding when to use arsphenamine, when heavy metals, and when iodides. Of a series of recent books and articles consulted with regard to the use of arsphenamine in the treatment of syphilis complicating tuberculosis, some advised its use generally, others advised its use sometimes, and under specified conditions, and still others advised against its use in any case of co-existent syphilis and tuberculosis. One distinguished writer says that arsenicals are contra-indicated in tuberculosis. Another equally impressive authority reports no bad effects on tuberculosis when the arsenicals are employed. A third says, "The sovereign therapy is arsenobenzol," (arsphenamine), and a

fourth says, "Great care must be used in the employment of the arsphenamines" And a fifth warns that the use of "606 or its analogues may be followed by disaster"

The contra-indications to specific therapy are not sharply defined Is hemoptysis a definite contra-indication to the use of arsphenamine? "At the least rise of temperature or attack of hemoptysis the specific treatment is to be discontinued or restrained," says one authority "Hemoptysis is no contra-indication," says another

And how about bismuth and mercury? Is it advantageous to use them, and if so, under what conditions? More conflict is brought to light by a comparison of expert opinion Of the various writers whose views are recorded in recent literature we find some strongly favorable to bismuth or mercury or both, and others who have little or no use for them Thus one states, "Mercury and bismuth should supplement the arsenicals," another remarks that, "Bismuth is safer than either arsphenamine or mercury," while several suggest the use of bismuth for the initiation of treatment

If we hope to find harmony with regard to the use of the iodides in the treatment of syphilis complicating tuberculosis, we shall again meet with disappointment A well known syphilologist says, "The only contra-indications to the use of the iodides are in tuberculosis especially with pulmonary involvement and in goitre whether simple or toxic" A writer on tuberculosis says flatly, "The iodides should not be used" A European writer, on the other hand, was able to say, "Most of the investigators recommend potassium iodide and aisenobenzol In general, iodide is looked upon as the milder, and its effect especially in the later stages is held to be better than that of other drugs" An American syphilologist says, "The iodides should be used in small doses and only with caution," while an American tuberculosis specialist states, "There is no need to withhold intensive anti-syphilitic treatment *including iodides* in cases of active pulmonary tuberculosis"

If, in our search for guidance as to the treatment of syphilis complicating tuberculosis, we are not already sufficiently confused, the finishing touches will be added when we consider dosage Guild and Nelson found that of the 27 sanatoria reporting the dosage of neoarsphenamine administered, ten gave small doses (from 2 to 4 G), sixteen gave doses of average size (from 45 to 6 G), and one gave large doses (9 G)

Such diversity of practice is only a reflection of the confusion we find in the literature One writer says, "The dosage of the arsenicals when employed in combined syphilis and tuberculosis should be reduced to one-half or one-third of the usual dosage," while another, speaking of syphilis in the cirrhotic forms of pulmonary tuberculosis, says "Larger doses of arsenicals should be used at first since fibrous cases of pulmonary tuberculosis react more markedly to small doses than they do to larger doses" A well known syphilologist states, "One must avoid large doses of the aisenobenzenes and indeed large doses of all the antileptic remedies for these lower resisting power whereas small doses increase the defensive reactions of the body" A writer on tuberculosis advises, "Relatively large doses of arsenicals," and in his reported work varied the dose from 3 to 9 G

One thing seems certain, not all of these methods can be optimum methods Some must be better than others—some may even be harmful In my study of this problem I have been impressed by the evidence that the syphilologists are more cautious in the treatment of syphilis in tuberculosis patients than the tuberculosis specialists appear to be, an observation which seems to me to have considerable significance

When we consider the many and serious differences of opinion and practices, of which I have mentioned only a few examples, we are led to seek an explanation I suggest two—first the complexity of the problem, and second the fact, as it seems to me, that the problem has not yet been

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Tuberculosis in Childhood

LAY ASIDE your stethoscope!

This bit of advice is offered as a desirable preliminary in the search for tuberculosis in children. Important as auscultation may be in recognition and study of tuberculosis in the adult, this procedure is of little or no help when dealing with the problem of tuberculosis in babies and youngsters.

The relatively small number of cases of active pulmonary tuberculosis in children seen in either pediatric or general practice is in sharp contrast to the surprising prevalence of the disease in other forms among juveniles.

Primary tuberculosis manifesting itself as the initial pulmonary focus (often referred to as the Gohn lesion) in combination with the associated tracheo-bronchial lymph node involvement creates a picture much too prevalent, and one which is often not recognized clinically.

Peritoneal forms of tuberculosis as well as the bone and joint cases and those involving the cervical lymph nodes are the usual types of tuberculosis attributed to the bovine strain of the tubercle bacillus.

Improved control in selecting milk cows and maintaining herds free from tuberculosis, together with the adoption of sanitary measures in the matter of handling dairy products have been important steps in the reduction of the incidence of bovine tuberculosis.

As rapidly as the general public accepts the advice of public health authorities in regard to the value of using only milk and dairy products properly pasteurized or cooked, there will be further marked decrease in cases of bovine origin.

The present day problems of tuberculosis in children include (1) Recognition of primary tuberculosis, (2) Protection of these cases and all other children from exposure to open cases, wherever they may be, (3) Application of knowledge regarding prevention of bovine tuberculo-

BY

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sis, (4) Adequate treatment of the child, sick with any form of tuberculosis, (5) Supervised use of the

B. C. G. vaccine as soon as competent health authorities have demonstrated its use to be safe and effective, (6) Extension of the program of education regarding tuberculosis.

The diagnosis of primary tuberculosis rests upon finding a positive tuberculin reaction, or the characteristic x-ray picture, or both. Generally these occur together and the diagnosis is further aided by the history of exposure. Clinical symptoms and signs are not sufficiently characteristic or constant to be of much value.

It is reasonable to say that routine testing of all children with tuberculin is highly desirable. Certainly the child with obscure symptoms, with subnormal development, and with known or suspected exposure to tuberculosis, should receive the benefit of the use of the test as part of a routine examination.

All positive reactors should have an x-ray made of the chest and this procedure should often be made in suspicious cases despite a negative skin reaction to tuberculin. In the x-ray the initial lesion may be demonstrated occasionally as the Gohn tubercle and will be consistently recognizable in the hilus changes either with or without calcification. This latter change is an indication of elapsed time of varying extent since the initial infection.

Every recognized case of primary tuberculosis in the lung implies a contact with an active case of pulmonary tuberculosis and requires thorough investigation in an effort to locate the source of the exposure. This case finding is one of the most important factors in tuberculosis control. It is in reality detective work that may tax the ingenuity of doctor, nurse or social worker.

Parents, relatives or others included in the circle of contacts in the home come under suspicion, when an inf

child has been found Teachers in school, other pupils, playmates and finally a large number of intimate contacts outside the family or school must be considered in the search

Increasing interest is being taken by school boards to establish the fact that teachers they employ are free from tuberculosis in infectious form The intimate contact between teacher and pupil has resulted in a surprising number of cases in children, where the teachers' infection had not been recognized

Considerable doubt exists as to the ability of one individual with primary tuberculosis to infect others It is improbable that this is a source of real danger The children with adult type of tuberculosis superimposed upon their primary infection are few in number and while as dangerous to others as adults in the same stage of the disease, are usually soon ill enough to be out of contact with larger groups of children As has been mentioned previously, it is fortunate that a large percentage of children with primary tuberculosis are able to carry out their normal routine of living without clinical evidence of the infection They do this without particular danger to themselves

As adolescence is approached the incidence of primary infection is surprisingly high and it is at this age that extreme caution must be exercised to prevent lowering of resistance and contact with open cases It is the reinfections of this period that are responsible for the large number of cases seen in the young men and to a greater extent, the young women of today The highest mortality from pulmonary tuberculosis is found among these relatively young individuals

The uninfected child should be protected as completely as possible and this often makes desirable removal from a home that is a potential source of infection The difficulty of accomplishing the desired end in this situation is often directly traceable to inability to adjust the economic status of the family

To the same cause may be laid the explanation for failure to get optimum re-

sults of treatment of recognized cases Prompt and sufficient attention to the bone and joint cases is not always possible and deformity and crippling that could have been prevented is far too prevalent

Much educational work must be done to acquaint the general public with the available accurate knowledge about the disease tuberculosis Much superstition and misinformation must be offset by simple direct teaching of the principles underlying control of the disease

Disregard of simple rules of hygienic living is responsible for many of the original infections These rules can be taught more readily to youngsters than to their elders

Tubeerculophobia must be replaced by a sensible cautious attitude and periodic health examinations should be encouraged, not so much with the expressed hope that cases will be found more promptly, but with thought that in these sensible procedures may be found the way to prevention

Far too little concern attaches to the occasional and often brief contacts of young children with sick persons The prevalence of the pernicious habits of persons outside the immediate family kissing babies and adorable youngsters is a definite indication of the ability of the average adult to balance their sentiment and common sense

A possible hope for the future is contained in work now being done to prove the efficacy of a means of preventing tuberculosis in infants and children In France one-fifth of all newborn babies are receiving preventive inoculation with a vaccine referred to as B C G Those physicians who are using this material in France as well as skilled scientific investigators in Canada and our own country are most enthusiastic about the results so far obtained by use of the vaccine in carefully controlled groups of cases They predict general acceptance of the procedure in the not distant future and entertain high hopes of an important

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The Early Diagnosis of Pulmonary Tuberculosis

THE SUBJECT of the diagnosis of active pulmonary tuberculosis has been presented repeatedly

BY
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for many years and the general practitioner has been criticized with varying degrees of severity for failure to make such diagnosis earlier. Hippocrates has been dragged in by his venerable ears with his apt remark on the difficulty of the recognition and the ease of the cure of phthisis in the early stage and the reverse in the late stage. The failure of physicians of the older generation to realize the significance of symptoms and signs of minimal and moderately advanced involvement is not entirely their own fault. It dates back to the discovery of the bacillus, with the consequent segregation of patients in special institutions, often at considerable distance from teaching centers.

Well do I remember, as a student, the few extra-mural ward-classes attended in the prison-like structure which was the last refuge of the city's defeated army of poverty and disease. I took a long breath before entering its forbidding doors and tried to breathe as little as possible as I penetrated its densely malodorous atmosphere. We were asked to gather around the beds of the dying and listen to amphoric breathing and cracked-pot sounds! I held back, lingering near the window, feeling too ill to be attentive and wishing my stethoscope were two yards long! The result was that as an interne in a hospital, which like the majority, strictly excluded cases of tuberculosis, I was harshly reprimanded for failure to recognize and refuse admission to such cases. This experience was so humiliating that I determined at the end of my service to learn something about this ubiquitous and treacherous disease on my own account. Accordingly, I joined the staff of a chest clinic, where for years were seen, chiefly,

advanced cases, most of which had become hopeless because of delay. On asking that most important

question "when were you last perfectly well" the reply was frequently "so long ago I don't remember." When asked as to the first symptom, that of fatigue easily led the list. I have found this true throughout the twenty-seven years that have followed, in state, federal and private work. "That tired feeling" from which the sufferer thinks he will soon recover or that it may be due to his work or his habits but to which he gradually becomes accustomed and pays less attention until other symptoms appear, is by far the "chief complaint." Of course it has become a by-word with our advertisers who profit by it and add to it by their billboards and radio and it may be a symptom of the great American neurasthenia or the great American indigestion, but they in turn are often symptoms of tuberculosis. When Mitchell's famous "test cure" of forty years ago, doubtless checked in its incipency many a case of tuberculosis. All three conditions, together or separately, are the result of what Mr. Dooley, the Will Rogers of the other Roosevelt regime, termed our "strenuous life."

Once I heard an amusing discussion, which fortunately took the place of a game of bridge between a neurologist, a lung specialist and a cardiologist. The last, being from Virginia did most of the talking, in the delightful mildly bantering manner of the experienced raconteur. He said, "a tired business man or a worn out society dame comes to see us. If they walk into Barlow's trap here, they are sure to be full of rales, if they see Bledsoe over there, they will be the victims of nervous prostration. If they drift toward a surgeon or a gastroenterologist, why of course it's visceroptosis, while if they come my way I am very likely to find an

interesting murmur, which may be systolic or pre-systolic! Fortunately for them, however, regardless of the diagnosis we all do the same thing—we insist on rest—we put them to bed, preferably in a quiet, pleasant place away from the irritations of home and friends and business. After three months, six months, a year, what has happened? The tales of murmur are gone, the nerves have regained their tone, the digestive functions have been restored!

“Associated closely with fatigue, really a part of it, is weakness. There is an actual loss of the power to do accustomed work. This is mental as well as physical. Slight tasks are dreaded and performed only with increased efforts, even the involuntary work of digestion, circulation and respiration are affected. Loss of appetite and loss of weight are consequences frequently accompanied by some abdominal distress. The results of the mental fatigue are irritability and insomnia. Pallor and on exertion, dyspnea, develop with impairment of the vascular system. The menses become scant or fail. All this may happen before cough appears.

“Cough,” after it has become persistent is the symptom which usually brings the patient to the physician, but even it may be disregarded with the general, immoderate use of cigarettes and the frequency of the common cold. It is slight and dry at first and the patient may not notice it for a time, thinking he is merely “clearing” his throat. Later sputum appears (usually mucoid and negative for tubercle bacilli) which in turn may be neglected, unless it is blood streaked. The cough and expectoration appears characteristically upon waking in the morning or for a little while after retiring, often during or shortly after a meal. All authorities stress the suspicious significance of such symptoms continuing beyond six weeks. Hemoptysis is a “lucky break” if it comes sufficiently early, as it hurries the patient to the doctor or the doctor to the patient. This golden opportunity, however, is sometimes missed by our natural dislike of facing unpleasant facts and too often the patient is falsely reassured that the blood did not

come from the lungs. Cabot's words should be remembered here: “The spitting of pure blood in any considerable quantity means pulmonary tuberculosis in the vast majority of cases, no matter what other symptoms are or are not present. The commonest mistake is the assumption that it is not tuberculosis in origin merely because the lungs show no abnormal signs and the patient feels perfectly well.”

Fever arises as the activity of the disease advances but is usually slight at first, occurring in the afternoon or early evening and increased by exercise or excitement. Text-books written ten years before the World War and influenza pandemic, insisted on a five minute registration of the thermometer. Ever since the exhaustion of the stock of such instruments at that time and their subsequent sale before proper ageing (formerly two years) there has been difficulty with even the best thermometers, so that the original injunction is more important than ever and the time might be doubled in all doubtful cases, particularly, as the patient may be entirely unconscious of the presence of slight fever. He may feel better during his elevation of temperature, more inclined to mental activity, a contrast to the morning when he usually feels tired and suffers from the depression of a subnormal temperature. During the fever the patient's cheeks may be flushed and his eyes bright, with dilated pupils which may be unilateral, corresponding to the side of the involvement. It is common for the pulse to be rapid before the fever appears. It also continues its acceleration after the latter subsides. While night sweats are not likely to occur until later, there is a tendency to perspire easily, even without exertion. Pain in the chest may be simply a slight soreness, a burning sensation or a dull ache usually behind one border or the other of the sternum or in the region of the apex, shoulder, or between or below the scapulae.

Hoarseness is common and may be the result of coughing or an expression of fatigue. The quality of the voice has con-

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Advances Made in the Control of Tuberculosis

GREAT CHANGES have come about regarding that disease once known as "consuming disease" Consumption, the Great White Plague of European history or tuberculosis as we know and speak of it to-day More particularly these changes have been brought about in the last decade or even in the last two or three years, although there is difficulty in the appreciation of current changes because of a lack of proper perspective to evaluate them

One of the most encouraging and outstanding phenomenon in the whole field of tuberculosis is the decline in the tuberculosis death rate from 200 per 100,000 population in 1900 to 69.2 per 100,000 in 1929 and in the continuation of this decline The fact that this phenomenon is almost world wide, Japan being the exception, is of further interest, concurring in most civilized nations today Then, too, there is the diminishing number of people with recognizable tuberculosis, which can be estimated as six to ten times the number of deaths from tuberculosis occurring in a locality

What has contributed to this result? How has it been accomplished? Not by any one agency, not by the doctors alone, but by the efforts of all agencies, doctors, nurses, social workers, philanthropists, public health and insurance officials, national and local tuberculosis societies, the sale of seals and stamps and by the aid of state, county and municipal governments How?

BY

1 The education of the public in regards to tuberculosis, its control, arrestment, prevention and to the fact that it is a curable disease

2 Its detection by the examination in grammar, high school and Universities Its early diagnosis and the lessened interval between its diagnosis and the segregation and beginning of treatment.

BY

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Oliver View, California

3 Sanatorium care with improved methods in securing and augmenting that fundamental necessity, lung rest, by surgical procedures which are, in fact, essentially mechanical means of augmenting lung rest over and above what it is possible to secure by bed rest alone

4 Post sanatorium care Rehabilitation, segregation of germ carriers, social and financial adjustments for the employment of the subnormal individuals

5 Our engineers, architects and national and local housing committees, by the eradication of slums, tenement areas, the housing of our denser population in modern well ventilated buildings with modern plumbing and sanitary means of disposal waste

6 Our pure food laws, inspection of cattle, and eradication of tuberculous cows

The education of the public by health officials, educators, social workers and by the staffs of sanatoria throughout the nation and the dissemination by the patients of our sanatoria have done much in banishing the thought that tuberculosis is an incurable disease

It has taught them the importance of the segregation of the active sick, that tuberculosis is a communicable disease, that every case of tuberculosis comes from another case, that it is not hereditary and there is doubt even of any hereditary disposition to acquire the disease by members of a family The fact that it has been known as a family disease, and rightfully so, is due to other reasons The members of a family are in closer and more intimate contact for longer periods of time, facilitating the infection of its members This is not apparent, due to the long interval between infection and the evidence of the active disease The public has come to realize its infectiousness and the means of prevention are becoming more apparent, also its curability by early and

prompt placement of the patient under suitable care

Detection Much has been done since 1882 when Dr Koch discovered the tuberculosis bacilli and 1891 when he prepared the first tuberculin "Old Tuberculin" Old tuberculin was first used as a treatment of tuberculosis, but a greater use of it has been as a means of detecting those who have been infected by the tubercle bacilli, known as the tuberculin test for tuberculosis. Several methods have been in use, Von Pirquet, a scratch skin test, Moris ointment test, Calmette's ophthalmic reaction test, and the Mantoux an intra dermal test, which is used by the majority in the tuberculin testing of today

Nothing much was done in the way of ferreting out cases of tuberculosis on a large scale until late years, more particularly since 1920. The earliest results of testing gave evidence of wide spread infection, particularly in our large cities and areas of densest population, the incidence varying from 60% to 90% positives, which gave rise to the so frequently heard phrase, that all of us are infected at some time in our lives—a statement much more true then than now. Testing our graded junior, senior high school and University students in different areas reveals in most parts a much decreased percentage of positive reactors. A survey shows Philadelphia University students and Yale freshman students showing 85% to 65%, the middle west, Wisconsin, 35%, California 32%, Idaho and the other Rocky Mountain states low, as would be expected because of the scattered population. A survey of an entire village in Minnesota was reported as 3%. A recent survey of Santa Barbara 7% and Los Angeles Junior and Senior High Schools 17% of positive reactors

To determine the necessity of treatment the positive reactors must be examined by the aid of x-ray films as well as by physical examination to obtain evidence of tuberculous pathology and disease, all cases of tuberculosis should, unless healed, receive immediate consideration for treatment. Not in all cases of

childhood type is it necessary to institute other treatment than finding and removing, particularly the child, from the source of infection. This is most important. Positive reactors only in 5% of instances show demonstrable lesions of tuberculosis and of this group only about 1% will need sanatorium care or its equivalent. Sputum and x-ray examination will cinch many a suspicion, eliminate a possible delay, which may mean saving many lives

Tuberculosis once discovered and not healed, should be placed under suitable treatment immediately, so that further infections of others may be avoided, also, that the disease in the lungs may be brought under control as early as possible to avoid the infection of the other organs and complications. This can be accomplished in the majority of cases in the early stages of the disease by means of lung rest, lung rest is bed rest augmented by collapse therapy, such as phrenic nerve interruptions and its ensuing relaxation of the lung following the paralysis of half of the diaphragm, either temporarily or permanently, as desired, by pneumothorax, the instillation of air into the pleural space, as a cushion or splint, that the lung may be quiet in partial collapse and later, after healing has taken place, can again be allowed to re-expand, also by replacing the air with oil, known as oleothorax, and by combinations of the above procedures. Where the results from these treatments are unsatisfactory, thoracoplasty may be of avail. This is the removal of the ribs on the affected side, thus allowing the chest wall to fall in on the lung

These procedures shorten the sanatorium stay and in addition furnish a greater assurance of permanent arrestment of the disease. Already the panorama in our sanatorium has shown a change for the better. Fewer distressingly sick ones meet the eye since there are fewer complications

As regards rehabilitation. Much interest is being shown in the post-sanatorium care of the tuberculous patient all over

(Continued to page 20)

Tuberculosis Among the Southern Negroes

TUBERCULOSIS in the Southern Negro is no different from tuberculosis in the Negro elsewhere. How-

ever, in the South he presents a grave problem for the tuberculosis worker. I think it can be safely said that no material lowering of the number of tubercular infected individuals can be obtained until more is done to find early cases of tuberculosis among the Negroes. By early cases, I mean they must be found and the Negro isolated before his sputum becomes positive. So far this is not being done very often. I believe it is more important to isolate positive cases of tuberculosis among Negroes than the white cases. What we need then, is more beds for the Negroes and especially do we need room in our county and state institutions for taking care of Negro children with their first infection.

To protect ourselves, we should stress more and more the importance of hospitalization of the Negro with tuberculosis. The Negro is most intimately in contact with the white man in the South. He is in our homes, our stores and our shops, working oftentimes close to us. He depends upon us for his very existence. The Negro is not noted for his personal hygiene. He is careless about his habits and about his person. His diseases are all too often our diseases. Many a child has contracted tuberculosis from a servant in a home. In looking over the histories of the patients admitted to our sanatorium we find that the occupation of the Negro women is largely that of domestic servant. Every home in which these patients worked is potentially, if not actively, infected with tuberculosis.

Why is it that we have this condition? Why doesn't the doctor of the patient stop him from working? Why does he not make it known to the family that this servant has tuberculosis? The answer is very sim-

BY
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ple. No one knows it until it is too late to do anything about it. All too often it is not known until a great deal of damage is done. Tuberculosis in Negroes quite often takes a very deceptive role, and fools everyone. A perfectly healthy Negro may go home from work one day and have a chill that night and be desperately sick the next morning with tuberculosis. Of course, he does not get the infection on the way home, but the infection has been dormant in the lungs for some time or, if active at all, very mildly so, causing no symptoms that would be noticeable to the Negro. He may or may not have had a slight cough, he probably has lost a little weight and has not felt quite as active as he does normally. About all that can be noticed in him is that he is a little more sleepy than usual, and not as good a servant as he was, but you will not think he is sick and he certainly will not think so himself. At the time of the acute illness, a doctor will see him and he will find him sitting up in front of a fire with a temperature of 101 to 103 degrees, and about all he will complain of is a bad cold. If he is examined at this time, he may or may not have evidence of pathology in his chest from physical examination. If he does have, it will probably be diagnosed as bronchitis, and he will be given some cough remedy and told to see the doctor in a few days if he does not get well. That will perhaps be the last time this doctor will see him. The Negro then begins his rounds. He will not get well and will go from doctor to doctor and take quack remedies until he can get no more or until he is unable to get about. Then, and only then, will he be diagnosed as tubercular and some effort made to get him into an institution. He has been going around, for months perhaps, probably back at work part of the time, and has been expectorating large numbers of tubercle

bacilli all over the town. At this time, every effort is made to place him in an institution where about all that can be done for him is to give him a place to die in moderate comfort.

From the above it would seem that the physician who first saw the Negro is responsible. This is only partially true. The doctor should feel his responsibility to his patient and his obligation to society. Physicians are making more examinations and doing more towards eradicating this disease than they have ever done before. But they work under a tremendous handicap. They do not have the clinical facilities that they need to make a diagnosis at the bedside and the Negro is not financially able to pay for them. The doctor sees the Negro in a hut and all he has with which to make an examination is his stethoscope, and only too often no physical findings are elicited in early cases of tuberculosis. There is one thing that he can do, and should do more often, have the sputum examined. If the doctor cannot do it himself, he can send it to the State Laboratories and have it done free of charge. If he is in a city where more damage is being done than anywhere else, he can usually send the patient to the city hospital for an x-ray examination. If the Negro has tuberculosis, he should make some effort to isolate the patient, either by placing him in an institution or by seeing that he remains in bed at home, in a room to himself and that he is instructed along the proper sanitary lines. He should take it upon himself to see if there are other cases of tuberculosis in the family. It is true that he would get very little, if any, compensation for his work and he may not have the time to do this as he should, but usually there is some young physician who is only too anxious to get work of any kind in the town. Why not turn this case over to him and let him work with the family and take care of the patient until something can be done? Everyone in the family should have a tuberculin test and those with positive reaction should be x-rayed.

The Negro's attitude toward sickness should be mentioned. He never thinks of

himself as being sick as long as he is able to move on his own strength. He may have a very bad cough, expectorate large amounts of sputum, and have a very poor appetite, but as long as he can walk around he thinks he only has a cold. He will try all kinds of remedies and hang on to the fact that he has no appetite and that if he could just eat he would be all right. He naturally does not realize the seriousness of his condition. If the doctor happens to find one of this type and suggests that he needs hospitalization or should stay in bed, the patient becomes frightened and is possibly never seen again. He has a mortal fear of hospitals until he is so far gone that he cannot help himself. He has a just reason to fear a hospital or an institution of any kind for all of his friends who have gone to such places seldom, if ever, come out alive. However, if once you can gain the confidence of your patient, he will do all in his power to get well, provided you have him under close supervision.

This brings up the treatment of tuberculosis in Negroes. As stated above, the majority of cases seen are acute exudative types of infection and they do not respond to ordinary routine treatment as well as the white man does. Surgery does not offer so much. They respond only fairly well to it. If the case is seen early and some method of collapse therapy can be instituted, good results may be obtained. The Negro has very few facilities for taking care of himself at home and should remain in an institution until he is able to go back to work as a laborer. We are only too prone to dismiss them from the sanatorium and tell them to find some light work to do. This is impossible for the greater part of Negroes. They have to work under adverse conditions and live in poor surroundings. In treating the Negro, if the doctor expects to get results, he should treat him vigorously and early. Then the patient be required to remain in an institution for a number of years before trying to make a living for himself.

Most of our institutions are not pre-

(Continued to page 28)

Group Insurance for The Tuberculous

FOR THIRTY YEARS great corporations of industry and other organizations employing or representing great bodies of men and women have taken interest in their health and physical welfare. The practical application of this interest makes one of the most gratifying chapters of evolutionary development in both the histories of industry and medicine. The first manifestation of this interest was—first aid to the injured, closely followed by hospitalization and care of the injured until they were restored. Out of this start grew the great field of industrial surgery. Gradually students of industrial medicine came to realize that periodic physical examination was of great advantage in finding illnesses and physical unfitness for service. The discovery and treatment of such conditions is of great humanitarian and economic advantage to all concerned. So, medical as well as surgical responsibility has been assumed by industry. Acute illnesses and disabilities readily amenable to treatment were found to be comparatively easy problems. Possibly the most complicated of medical problems that have confronted industry has been tuberculosis. Tuberculosis requires months of hospitalization and technical treatment, together with many more months of convalescence before the patient can be rehabilitated for duty. Because it is a transmissible disease the isolation of the open case has added to the problem. But industry and the great institutions responsible for the welfare of many have struck telling blows on this disease in spite of its being a complicated problem. Many organizations and corporations constructed and operated sanatoria for the treatment of tuberculosis. Others provided cash allowance for the patients while totally disabled from tuberculosis, that they might provide themselves with treatment and necessities during their in-

BY
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El Paso Texas

capacity. Others provided total and permanent disability compensation for far advanced cases that medical opinion despaired of restoring. Others contracted with private sanatoria for the hospitalization of their cases.

Let us review briefly these several plans. For an organization or corporation to construct a sanatorium and operate it means the entering of a new field of business. Unless the organization's employees or members are limited to a fairly small locality the question of location of the sanatorium, to be owned and operated by the organization, is very difficult to decide, else it may be of advantage to some and a grave disadvantage to others. Not only does the institution have to be constructed but a staff must be organized and perfected of physicians and nurses and others, professionally trained, all of which is entirely foreign to the organization's or the industry's reason for existence. The cash allowance given outright to patients suffering from tuberculosis only too frequently is unwisely and poorly expended. It is used as compensation to replace wage earners' salaries and the patients are not properly treated for their tuberculosis and will too frequently remain a contact with their wives and children and thereby endangering the contacts' health as well as failing to improve their own. Total and permanent disability compensation for tuberculosis is a wise and humanitarian procedure, but if responsibility for this malady is taken at all, it should be assumed before the case has been defeated by the disease, and at a time when isolation of the open case would be safest for the contacts.

Time has proved that the utilization of private sanatorium beds is the most practical. Intensive hospitalization of the active case brings better results and quicker than any home treatment plan and as a

consequence costs the organization less money for a completed case

The Federation of American Sanatoria is an organization comprised of the private sanatoria treating tuberculosis in the United States and the physicians specializing in tuberculosis in the private practice of their specialty. This union, a federation in principle, is designed to have all the advantages of organization with all disadvantages eliminated. With our annual meeting, in which scientific papers are read and discussed on the hospital treatment of this disease, we tend to develop a system of treatment similar in all the institutions throughout the country. In addition to correlating the medical treatment of our cases, our efforts are bent toward the standardization of the service in the private sanatoria making up our organization. This standardization is comparable to that of the standardized general hospitals under the patronage of the American College of Surgeons. The Federation of American Sanatoria is making an effort to go on the hospital market, if you please, and offer to industry, corporations and organizations a standardized type of hospital service for

tuberculosis, available in any and every section of the United States, North or South, East or West, rural or urban, at sea level or on the mountain, on the seashore or in the desert. The private sanatoria and members of our federation are working towards the most practical of scientific treatment and the standardization of hospital procedure. And because we are a federation and not hampered and bound by centralized control, each sanatorium is a private and individual unit, capable of making and putting into operation that type of contract or agreement most acceptable to the organization or corporation concerned and the individual institution. The general office of the Federation will supply the interested organization or corporation with a roster of our entire federation membership, a roster by states or any other geographical division, or any general information regarding the institutions our Federation represents. But our institutions are free to make any type of contract that they desire and are bound to no rules by the Federation other than the ethical rules and regulations of the practice of medicine. (*See page 4 for open letter and list of sanatoria*)

ADVANCES MADE IN THE CONTROL OF TUBERCULOSIS

(Continued from page 10)

the nation and in our own locality, an effort is being made to study the individual patient as to his or her abilities and aptitude for the various occupations and activities that will be feasible for the subnormal to earn a livelihood. Often times it is best for the individual to pursue a modification of his previous occupation since he is familiar with it, and for this reason it will require less effort on his part.

Housing Committees Such committees have co-operated with health officials in removing tenements and unsanitary factories and work houses, replacing them with modern, sanitary buildings, well lighted, ventilated, and supplied with the means of waste removal. They have in this way done much to reduce the incidence of sickness and ill health.

Pure food laws The tuberculin testing

and disposal of tuberculous cattle, the prohibiting of sick people, tuberculous and otherwise, from handling food or working in bakeries, have done much good. The further enforcement of these laws would be of advantage. Also there should be a medical examination and a ferreting out by tuberculin testing and x-ray examinations of the tuberculous among our govennesses, teachers, nurse maids, as well as the students in our schools. In this work the general practitioner can be of great aid to the public and enhance his own standing in the community, besides accomplishing much in lowering our already lowered mortality rate from tuberculosis.

It would seem timely that all physicians obtain the National Tuberculosis Association little booklet, titled *Diagnostic Standards on Tuberculosis*, 10th edition, 1935. It is well worth one's time to read

TREATMENT OF SYPHILIS COMPLICATING TUBERCULOSIS

(Continued from page 10)

adequately studied. That the problem is complex may be conceded, when we consider that for purposes of classification the courses both of syphilis and of tuberculosis may be divided into several stages indicative of degrees of activity and extent of pathologic advancement. In general, we divide the course of syphilis into early, latent, and late, and that of tuberculosis into minimal, moderately advanced, and far advanced. If my arithmetic is not at fault this means that there are nine different general combinations, each subject to change with time or treatment or both. Thus, we may have early syphilis and moderately advanced tuberculosis or latent syphilis and minimal tuberculosis. It must be obvious that the proper treatment of syphilis complicating tuberculosis will depend upon the respective stages of the two diseases.

There is an appropriate treatment for early syphilis but it is not identical with that for patent syphilis and even less does it resemble the various regimes for late syphilis. If the syphilitic patient also has tuberculosis, the therapeutic problem becomes not simpler but far more complicated, and as Orszagh points out, the patient is very likely indeed to die of his tuberculosis before he has a chance to die of his syphilis, unless the treatment is appropriate.

As previously indicated, it is not only with regard to treatment that thorough and careful studies remain still to be made. Answers are needed also to other questions, for example "What part, if any, does syphilis play in the etiology of tuberculosis?" "Does concomitant syphilis render the prognosis of tuberculosis more grave?"

The answers to these and other questions of importance can only be given on the basis of laboratory research and studies of large groups of patients in all stages of syphilis and tuberculosis. An important beginning has been made at the Henry Phipps Institute in the studies by Aronson of syphilis complicating tuberculosis in experimental animals. Aronson

stated (8) as a part of his tentative conclusions that, "The experiments recorded indicate that the injection of tubercle bacilli of bovine type into the skin of rabbits previously infected with syphilis resulted in a more severe inflammatory reaction and the earlier appearance of a gross tubercle, which in general extended more rapidly and was more progressive in character than similar lesions in non-syphilitic rabbits. The more intense inflammatory reaction noted in the syphilitic rabbits within two or three hours following the injection of tubercle bacilli suggests a non-specific irritability of the tissue due to the syphilitic infection." More studies of this type are needed, studies that tend to show how these two widely prevalent diseases affect each other.

It is possible that analyses of case records and postmortem findings would supply some of the desired information, but it may well be that only by experimental, comparative methods with adequate controls can we arrive at definite answers as to what should be the treatment of syphilis complicating tuberculosis.

The better tuberculosis sanatoria would appear to offer the most favorable opportunities for such studies for in them the patients are under control for considerable periods of time, adequate therapeutic procedures can be carried out under accurate observation, and laboratory facilities are in general available. Is it too much to hope that soon a group of scientific men thoroughly familiar with tuberculosis and with syphilis will take up these problems and study them patiently and exhaustively? Until this is done, until more facts are available, the present chaotic condition of conflicting opinions will continue.

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CASE REPORTS*

ADENOCARCINOMA

Mr W B T, occupation, plasterer, age 34, tuberculosis and cancer

This patient was admitted to sanatorium giving a history of having been under medical treatment for two years, his cough, fever and expectorating were increasing. Father of six children, the youngest, a baby in arms and ranging in stair step order. Only a casual observation revealed the necessity of returning this man to earning capacity as soon as possible.

While considering the advisability of giving pneumothorax, he had a severe hemorrhage, four weeks after admission. Pneumothorax was given on the right side and was so successful that in ten weeks he left the sanatorium and resumed his occupation.

Interesting features about this case are as follows:

After 2 or 3 years his lung was allowed to re-expand, observing re-expansion under the fluoroscope. At the end of 6 or 7 months patient complained of not feeling so well and raised blood and insisted upon having pneumothorax again. Over a period of 7 years pneumothorax was administered, at intervals. About the 5th or 6th year he was in an automobile accident and had a severe abrasion over his back and shoulder, the wound was cared for with antiseptics. One month later he returned stating that the abrasion would not heal. Upon examination it was found that a large flat brownish black mole had been partly torn away, X-ray therapy was instituted and the wound healed. A skin specialist decided that the skin lesion was probably a seborrheic keratosis. Eighteen months later when mole and accident incident was forgotten, while administering pneumothorax he called attention to the fact that he had a lump in the right axilla. He had some turbid pleural effusion at times during the period of pneumothorax administration.

Several months later he presented himself complaining of cerebral symptoms and was very nervous, had attacks of severe headache, nausea, vomiting and dizziness. Tuberculous meningitis was suspected and a spinal puncture was done. Spinal fluid was found to be bloody and under pressure. IOCC's was withdrawn with some relief of the headache, nausea and tendency toward stupor. Relief was only transient however, and within a few days death ensued.

Comment

In case of known tuberculous infection, it is natural to ascribe all symptoms to the known infection of tuberculosis, and to be somewhat negligent in the consideration of other intercurrent diseases that may develop.

Report of Postmortem Examination

By Dr W W Waite, El Paso, Texas

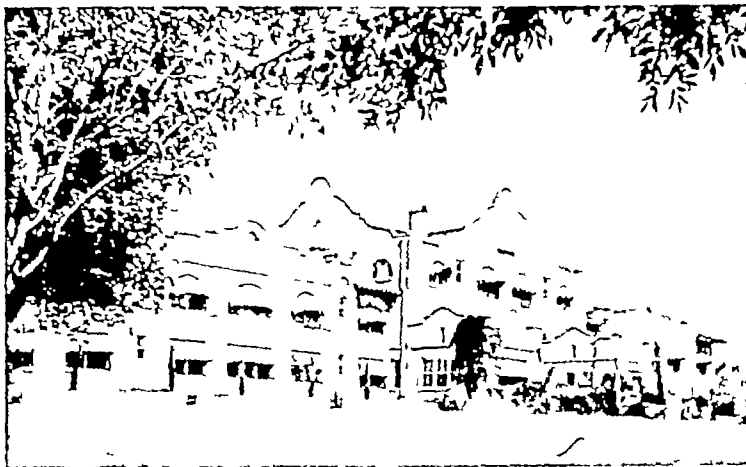
The body is that of a slender white man, poorly nourished. There was a nodule in the right axilla about the size of an egg. On section it was fairly firm and was a definite new growth.

On opening the abdomen, there was nothing of special significance.

On opening the chest, the right lung was quite well collapsed except for a few supports by old adhesions. Left lung was in fairly good condition. Heart showed no gross lesions.

On opening the brain, there was considerable hemorrhage in various places in the brain substance or hemorrhagic areas and these were of various sizes and when sectioned, small white nodules seemed to be present somewhat in the walls of the hemorrhagic areas.

Microscopic examination of some of these areas showed a distinct new growth like the one in the axilla. The new growth is epithelial in type with a tendency to be glandular in arrangement, but this is not very marked. The general impression is that it must have been an adenocarcinoma.



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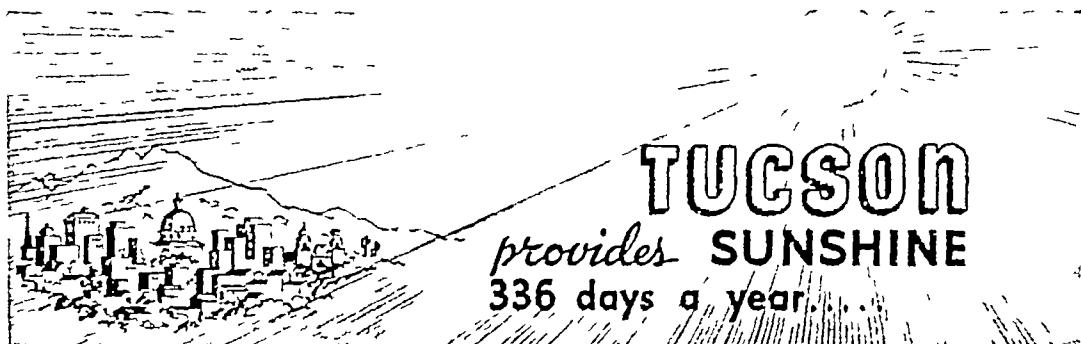
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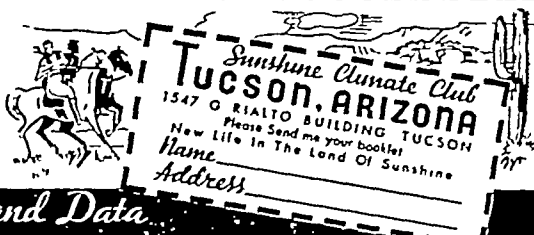
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CLIMATOLOGICAL DATA (Compiled from U. S. Weather Bureau Report)

TEMPERATURE (Normal temperature—45 year average)	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	49.7	52.2	57.5	64.3	71.4	77.4	82.7	89.7	79.2	68.1	57.5	49.8	
RADFALL (The falling—45 year average)	.8	.9	.81	.32	.14	.23	.24	2.48	10	6	.76	1.09	115.2
HUMIDITY (Monthly—45 year average)	81	55.4	44.8	45.4	28.4	29.3	34.2	57.3	47.1	46.3	57.1	74.2	49.5
	25.3	27.2	22.4	22.4	15.9	17.7	24.7	35.7	29.0	28.5	41.1	48.1	29.9



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THE FINAL DIAGNOSIS OF PULMONARY TUBERCULOSIS

(Continued from page 14)

siderable significance in some cases as an indication of the patient's general condition. Of course, the hoarseness may indicate the early complication of laryngeal involvement, often with a history of frequent "colds"

All the symptoms mentioned should be brought out as fully as possible in the first interview. They should be inquired into definitely if not given voluntarily. It is generally agreed that a thorough history, elicited by one who is alert to its significant features is of greater value than any other procedure in the examination of the early case. In addition to the points already mentioned, exposure to an advanced case, especially in early childhood, is extremely important. The previous occurrence of measles, whooping-cough, influenza, pneumonia and pleurisy are suggestive, highly so, if followed by protracted convalescence. More than one attack of pleurisy should justify suspicion.

The laboratory findings at this stage are largely negative, except for some anemia. The blood-pressure is usually low. The stethoscope may reveal nothing or there may be prolongation of the expiratory sound, with a suggestion of fine rales, or "stickiness", especially in the apex. Subsequent examination may bring out actual rales, on inspiration, after cough, which, if localized and persistent are practically pathognomonic. Other methods of examination than auscultation are of little use here. The X-ray, however, is of such invaluable assistance, that it should never be omitted and with the history, may be all that is necessary to make the diagnosis. So the general practitioner

need not be an expert in physical examination but should be able to detect early cases by the use of his usual good judgment and dependable X-ray films.

The tuberculin test should be limited to young children and performed only by those who have had abundant experience in its technique and interpretation. Much needless anxiety has resulted from lack of skill in these respects.

As to differential diagnosis, while there are lists of considerable length in most text-books, setting forth various pulmonary and non-pulmonary diseases, which might be mistaken for tuberculosis, the actual experiences of this clinic, over a period of many years, is that the chief conditions which are referred to us for such consideration are focal infections from teeth or sinuses, intestinal parasites (particularly hook-worm, syphilis and thyrotoxicosis).

As a tribute to the late Thomas McCrae, who for so many years carried on the work of Osler, may I quote in conclusion, the final paragraph of the chapter on tuberculosis in their famous text-book:

"A last word on the subject of tuberculosis to the general practitioner. The leadership of the battle against this scourge is in your hands. Much has been done, much remains to do. By early diagnosis and prompt systematic treatment of individual cases, by striving in every possible way to improve the social condition of the poor, by joining actively in the work of the local and national anti-tuberculosis societies, you can help in the most important campaign ever undertaken by the profession."

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TUBERCULOSIS AMONG THE SOUTHERN NEGROES

(Continued from page 18)

paired to care for these cases indefinitely as it seems necessary to do. Here is a problem that can be handled to a measure by the public health units. The Negro, dismissed from an institution, should at once be registered with some such unit and should receive constant supervision for a number of years. He should be taught the importance of periodic examinations. He should have plenty to eat and a good place to sleep. He should be taught to personally conduct himself so that he will not be a menace to his associates. If work can be found for him, it should be investigated before he accepts the position. He should not be allowed to come in contact with those to whom he might transmit the dis-

ease. He should have been taught how to handle his sputum and how to protect others while at the sanatorium. He should ever be reminded of this and not allowed to slip back into his old careless way of living.

This may seem a Utopian Ideal, but until some headway is made along these lines we need not expect to do so very much towards eradicating the disease from our midst.

In conclusion, I would like to repeat and stress the following points: early diagnosis, early and vigorous treatment in an institution, prolonged after-care of the patient.

TUBERCULOSIS IN CHILDHOOD

(Continued from page 12)

advance in the control of tuberculosis through application of preventive vaccination.

Till the health authorities of our country reach a more nearly unanimous acceptance we will find the procedure only sporadically applied. This cautious attitude seems at present entirely justified.

When preventive measures are available and specific aids to treatment dis-

covered, the terrible offender tuberculosis will be brought under control. Till such a time the periods of infancy and childhood will provide an opportunity for the inroads of this most treacherous infection and many lives will be taken.

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ABSTRACTS

Diagnosis of Activity of Internal Tuberculosis in Children by Blood Examinations *Nederlandsch Tijdschrift v. Geneeskunde, Amsterdam 71 1277-1360*

Gugelot tested the sedimentation speed of the erythrocytes and the shifting of the nuclei of the neutrophil leukocytes in 206 children with clinically demonstrable internal tuberculosis. In only two cases did the results of the blood examination fail to agree with the clinical diagnosis. The combination of increased sedimentation speed and nuclear shifting has the most significance for activity of the tuberculous process. It was never found in inactive cases, but was present in eighty of ninety-five clinically active cases. In tuberculin-positive patients nuclear shifting was more frequent than pathologic sedimentation. He thinks it probable that the former is dependent on the tuberculous infection, and that its presence shows that the infection is not yet extinguished, whereas the increase in sedimentation speed occurs only when the breaking down of the cells has passed a certain limit. If this were true, increase in sedimentation speed would not, as a rule, occur without nuclear shifting, this he found to be in fact the case. With retrogression of the clinical signs of activity, sometimes the nuclear shifting, sometimes the sedimentation time was the first to return to normal. The tuberculin-negative patients presented, for the most, normal values, as regards sedimentation speed, the same was true of the tuberculin-positive, but clinically inactive cases, but increased nuclear shifting was present in 23.5 per cent of these cases, as against 12.5 per cent in the tuberculin-negative group. In a child who reacts to tuberculin and who presents pulmonary changes pointing to tuberculosis, normal

values in the blood speak strongly against an active process, even though the temperature is somewhat variable, a distinct nuclear shifting without increased sedimentation speed confirms the tuberculous infection or speaks for lability of the process, abnormal values, even with approximately normal temperatures, are a tolerably certain indication that the tuberculous process is active.

Effect of Pasteurization on Tuberculous Milk *Lancet, London 1 215-268*

Experiments have been carried out by White with naturally infected milk from cows with tuberculous udders, with milk contaminated with cultures of tubercle bacilli, and with milk to which ground-up caseous tuberculous glands have been added. The method employed was to raise the temperature of the milk to 62.5 C and to keep it at this temperature for thirty minutes. The results obtained by inoculating such pasteurized milk into guinea-pigs have shown clearly that pasteurization carried out under these conditions ensures a non-infective milk so far as *B. tuberculosis* is concerned.

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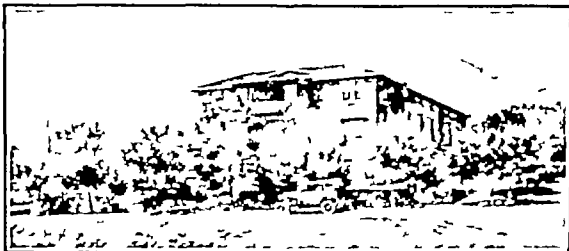
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By Foster Murray, M D, Brooklyn, N Y

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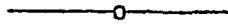
THE FAMILY PHYSICIAN

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FATIGUE is the outstanding danger symptom
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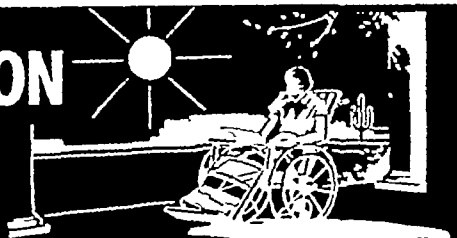
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RAINFALL (inches)	0.96	0.81	0.32	0.14	0.23	0.10	0.06	0.07	0.10	0.12	0.15	0.17
HUMIDITY Average monthly (percent)	61	56	48	40	35	31	29	30	35	41	46	51



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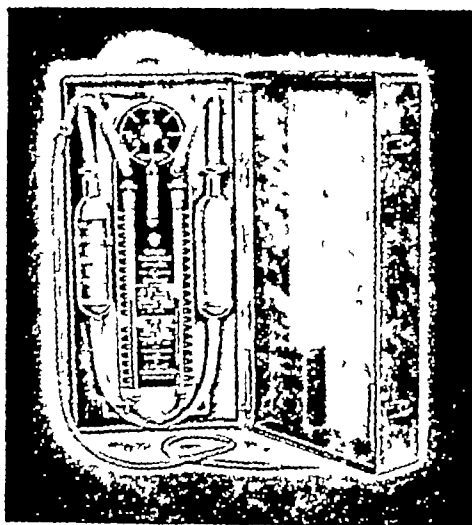
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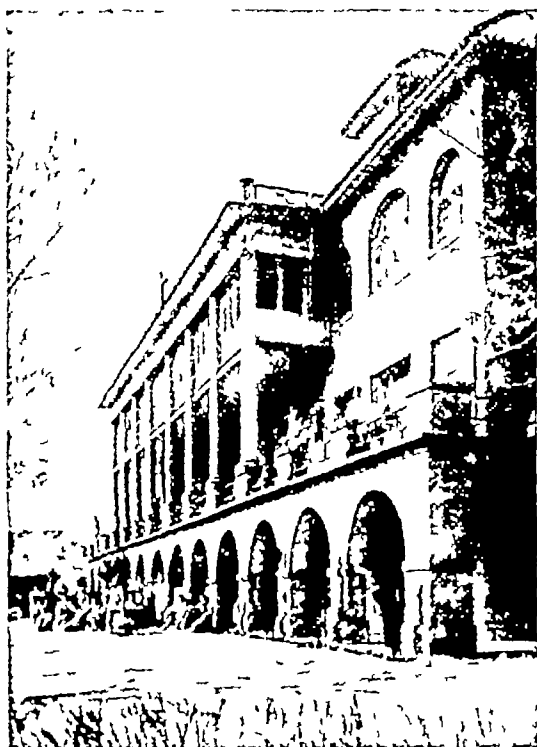
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Physician in Chief

*"This Open Letter is Addressed to Physicians and Officials connected
with Industrial and Welfare Organizations"*

COMMITTEE ON ECONOMICS FEDERATION OF AMERICAN SANATORIA

(A National Association of Private Sanatoria and Chest Specialists)

MYRTLE AND VIRGINIA STREETS
EL PASO, TEXAS

November 1 1936

Gentlemen

This is the eleventh in a series of open letters addressed to physicians and officials of welfare organizations. If you did not receive the previous issues, we will be pleased to furnish you with copies upon request.

The Federation of American Sanatoria believes that those patients who are able to pay for private care should be given the advantage of the individual attention, which the private sanatorium is able to offer.

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Learn about this humanitarian project by addressing the Committee on Economics of the Federation of American Sanatoria at the above address.

Sincerely yours,

COMMITTEE ON ECONOMICS,

Federation of American Sanatoria

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'The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind

Lawrason Brown, M D

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Editorial Comment

Congratulations Associated Editors Of Tuberculosis Publications

THERE ARE approx-
imately seventy five
publications deal-
ing with tubercu-
losis issued month-

ly by the tuberculosis sanatoria of this country. Some of these publications are mimeographed sheets while others are printed newspapers and many of them are in magazine form. The publications are edited by the patients of the sanatoria and in most cases are supervised by the medical directors or by some member of their staffs. A number of the state sanatoria receive appropriations to defray the cost of printing and editing their periodicals, but in most cases, the magazines or "San Mags" as they are commonly referred to, are supported by the patients at the institutions through subscriptions and by the sale of advertising, principally that of the local merchants and friends of the institutions. Some of these publications have a circulation of several hundred copies monthly, while others circulate many thousands of copies each month. It is estimated that the combined circulation of these seventy five sanatoria publications reach more than one hundred thousand readers monthly.

For many years, these publications have offered to patients an outlet for expression and a means for occupational therapy, and each of the publications, in

its own way, has conducted an educational campaign directed towards the prevention, early diagnosis, and the treatment of tuberculosis. That they have served and are serving a necessary and useful purpose is shown by their reader interest and their many years of useful activity.

In order that a number of their splendid ideas and activities might be coordinated into a program which would reach all of their readers, they decided that they would organize themselves into an association to be known as the "Associated Editors of Tuberculosis Publications" (AETP).

The Organization Committee is composed of the following editors of tuberculosis publications: Chairman Murray Kornfeld, managing editor, "Diseases of the Chest"; Vice Chairman, Carey Holbrook, editor, "Health City Sun," Albuquerque, New Mexico; Secretary-Treasurer, Mrs. W. M. Harman, editor "The Buzzer," Essex Mountain Sanatorium, Verona, New Jersey. The other members of the committee are: Marie Bowie, editor, "SoCaSan Piper," State Sanatorium, South Carolina; Myrtle Rockwood, editor, "Gut Gun," Perysburg, New York; Lee Burton, editor, "The Stethoscope," Oakdale, Iowa; and R. W. Henson, editor, "The Chaser," State Sanatorium, Texas.

One of the main objects of the association will be to work for the establish-

ment of a Tuberculosis Week, which will be similar to other periods set aside by presidential decree, and at which time the public will be encouraged to visit their family physicians for chest examinations, x-rays and tuberculin tests

Diseases of the Chest heartily endorses the program and the purposes of the Associated Editors of Tuberculosis Publications

C M H

Southwestern Medical Association THE CLINICAL Conference of the Southwestern Medical Association will be held November 19-20-21, 1936, at El Paso, Texas

This is an intensive three day Post Graduate Course, which will be of interest to every physician in the far southwestern and southern Rocky Mountain regions

Every speaker is a prominent teacher. The Program Committee has been very fortunate in securing these outstanding men who will provide the most instructive program possible

The Officers of the Southwestern Medical Ass'n extend a cordial welcome to all physicians who may find it possible to attend. The program below speaks for itself

General Medicine

Dr. Ralph A. Kinsella, St. Louis, Missouri, Professor of Internal Medicine, St. Louis University School of Medicine

General and Thoracic Surgery

Dr. Harold Brunn, San Francisco, California, Professor of Surgery, University of California Medical School

General and Traumatic Surgery

Dr. Isidore Cohn, New Orleans, Louisiana, Professor of Clinical Surgery, Tulane University School of Medicine

Urology

Dr. Nelse F. Ockerblad, Kansas City, Missouri, Associate Professor of Clinical Surgery, University of Kansas School of Medicine

Röntgenology

Dr. James T. Case, Chicago, Illinois, Professor Radiology, Northwestern University School of Medicine

Internal Medicine and Allergy

Dr. Warren T. Vaughan, Richmond, Virginia, Editor of Journal of Laboratory and Clinical Medicine

Otology, Laryngology, Rhinology

Dr. Thomas E. Carmody, Denver, Colorado, Past President of the American Laryngological, Rhinological and Otolological Society

Obstetrics

Dr. Willard R. Cooke, Galveston, Texas, Professor of Obstetrics and Gynecology, University of Texas School of Medicine

C M H

Statistical Survey DURING THE MONTH of November, the Statistical Committee of the Federation of American Sanatoria will mail questionnaires to every tuberculosis sanatorium in the United States. The object of this survey is first, to ascertain the facilities for post graduate training in tuberculosis now existent, and, second, to acquire accurate information as to the number of beds now available and the number of beds needed for the care of the tuberculous.

The cooperation of the superintendents of each institution is requested by the committee

R B H

Happy Birthday THE HEALTH CITY SUN of Albuquerque, New Mexico is to be congratulated upon having successfully completed seven years of service in the interests of the tuberculous of this country.

The Health City Sun is the only tuberculosis newspaper in the United States published as a weekly and its existence and editorial purpose is a fine tribute to its editor and owner, Carey Holbrook.

Mr. Holbrook is supporting for election in the State of New Mexico, two ex-patients, one a republican and the other a democrat. It will be interesting, in the event of their election, to watch their voting, particularly on legislation affecting the tuberculous of this country.

Diseases of the Chest wishes the Health City Sun many more happy birthdays

M K

Tuberculosis in the Child: Its Relation to Tuberculosis in the Adult*

BY

CHARLES V. BARLEY MD F.A.A.P.**
Tucson Arizona

OUR PRESENT concept of the problem of tuberculosis in the child and its relation to tuberculosis in the adult has been developed as the result of enthusiastic efforts to study the disease and to observe the phenomena of its various stages throughout infancy and childhood, which has been up to about fifteen years ago, a neglected age period. As statistical studies make it evident that the periods of adolescence and early adult life are charged with high morbidity and mortality rates from the adult form of phtisis, it becomes more apparent that something goes on in the period of infancy and childhood which has a bearing on the high incidence of clinical tuberculosis in these later age periods. The methods of clinical investigation suitable for demonstrating the disease in the adult were found to be of very little aid in bringing to light a picture of what was taking place during the preadolescent age period in those children who later develop the adult type of tuberculosis with cavity formation. With the hope that, by controlling the spread and progress of the disease during the period of infancy and childhood, we should be reaching the fountain head of tuberculosis, careful studies were begun some 15 or more years ago. These studies, because they have permitted the close follow up of thousands of cases from infancy and early childhood throughout a period of many years, have made it possible to observe the disease in its inception, through its various stages, and into the teen age and early adult periods. The results of such studies have caused us to abandon some of the orthodox views, and each year is adding more to our conception of prognosis, the significance of findings, and the rationale of therapeutic procedures. It is my purpose merely to

present the ideas which are recognized by most of the workers in this field, concerning the relation-

ship between tuberculosis in the child and in the adult in such a way as to afford a practical working basis for the understanding and care of the child with a tuberculous infection. An attempt will be made to explain what we mean when we speak of the primary infection, or so called "childhood tuberculosis," and in what ways it differs from the later reinfection type, or so called "adult tuberculosis." It is acknowledged that there are many questions not yet completely solved which will be clarified by further studies over longer periods of time.

If one studies a graph representing deaths from tuberculosis plotted by ages, it is noted that there is a high peak in the second half of the first year of life, representing infant mortality, and that thereafter there is a rapid fall in the curve, which persists at a low level until the adolescent period is reached. It is thereby demonstrated that throughout this latter period the disease pursues a relatively benign course. With the onset of adolescence the curve rises sharply, that of girls, because of earlier maturity, rising earlier than in boys, and the great peak being reached between the ages of 20 and 30, after which there is a gradual decline throughout the later years of life, until the meridian of life is past, when it gradually rises again, being, according to statistics, highest in old age. The clinical course and anatomical features of the disease that produce this first peak, in infancy, are quite different from those that produce the later peak in the adult age period. We have known for some time, however, that the first or primary infection has essentially the same characteristics at whatever age it occurs.

This first infection tends to pursue a characteristic course. Although familiar

*Read at the Rocky Mountain Tuberculosis Conference Albuquerque N. M., September 29 1935

**From the Tucson Clinic.

to most of those present the important stages in its development and progress may be cited as follows

(1) Tubercle bacilli enter the body, usually by way of the upper respiratory tract and lodge in some part of the lung, as often at the base as at the apex. The liberation of tuberculin at this site produces a mononuclear cell pneumonia accompanied by tubercle formation.

(2) Tubercle bacilli are disseminated to the regional tracheobronchial lymph glands, through which barrier they may sometimes pass and, by way of the thoracic duct and general lymphatics, involve remote lymph glands. It is not yet known in detail, however, the extent to which the bacilli of first infection are distributed throughout the body.

This lymphadenitis of the regional tracheobronchial lymph glands and the primary focus in the lungs constitute what is known as the primary complex.

The clinical picture in the patient during this period is as follows. There is a period of three to six or eight weeks after tubercle bacilli gain entrance into the body, during which there are no symptoms at all, although there have been instances when organisms have been found in the gastric contents at this time. This is the preallergic period of the first infection. The allergic phase of the primary infection is ushered in by four outstanding clinical findings which occur at about the same time, although one may precede one of the others by a brief period.

(1) Fever

(2) Cutaneous sensitivity to tuberculin

(3) Increased sedimentation rate of the red blood cells

(4) X-ray picture of a perifocal pulmonary infiltration of greater or lesser extent which may or may not be accompanied by recognizable physical findings. The most striking feature is the large amount of involvement revealed by the x-ray as contrasted with the paucity of clinical symptoms.

This initial fever is usually transitory, but the sedimentation rate remains in-

creased even after the temperature drops. The pulmonary infiltrations, depending upon their density and extent, remain recognizable by x-ray for varying periods throughout several months, eventually undergoing resolution and terminating in the production of fibrotic or calcified scars.

It is seen, therefore, that after a transient, initial period of acute onset, which is frequently not recognized, the further course of the first infection is relatively benign and retrogressive, usually, without cavity formation and other destructive lesions. However, this benign course may be and is occasionally interrupted by the escape of bacilli beyond the confines of the local lesion in the lung or glands, with dissemination of tubercle bacilli by way of the blood stream to distant parts of the body, producing tuberculosis of such organs as the spleen, liver, and meninges, and in some instances generalized miliary tuberculosis ending in death. This is more apt to occur at an early period in the development of the disease, before a very high degree of specific immunity has developed to wall off the process, and accounts for the first peak in the mortality curve occurring in infancy. Although the probability of disseminated tuberculosis is related to the dosage of organisms which the victim takes into his body, evidence at present indicates that this is more often an accidental occurrence, rather than one dependent on the tissue defenses of the body. Infection, especially in the case of infants and young children, may also gain entrance by way of the gastrointestinal tract, and in these cases pursues a course analogous to that described above. By the employment of more accurate methods of examining for tubercle bacilli, and by searching stomach washings and stools in cases where satisfactory specimens of sputum cannot be obtained, we have learned that the escape of organisms from these primary foci occurs more commonly than was previously thought.

Tuberculosis of the reinfection or "adult" type presents features of a dif-

ferent character, beginning in the lungs and producing the following changes

(1) It begins, usually, in the upper part of the upper lobes, often far removed and even in the opposite lung from the demonstrable primary focus, and tends to remain localized in the lung, most often in the upper parts

(2) As compared to the first infection, the lymphatic structures and regional lymph glands show relatively slight involvement, and gross caseation of these structures, as often occurs in the primary infection, is relatively rare

(3) Blood stream dissemination and the production of miliary tuberculosis are uncommon occurring usually as an accidental and late event

(4) Progress of the disease, when it occurs, is usually by way of the bronchial tract to involve other parts of the lungs, and also the larynx and intestinal tract

(5) The disease tends to pursue a chronic course, often attended by cavity formation, with healing by fibrosis

The reinfection type of tuberculosis does not appear commonly until the approach of adolescence, and, then, as shown by the mortality curve, increases rapidly in frequency, paralleling the number of positive tuberculin reactors, just as the presence of a primary infection increases with advancing age. However, rarely the infant may develop the reinfection type a relatively short time after the primary infection is produced, and this may go on to cavity formation and early death. Again, continued massive exposure outdistancing the rallying of immune defenses is probably a factor in the production of these cases of the reinfection type at an early age. It has never been conclusively demonstrated that there is a racial difference in reaction to the first infection, and the higher mortality figures for certain groups of Mexican, Indian, and Negro children is probably caused by environmental factors responsible for the early onset of the reinfection type, giving rise to this form of the disease prior to the period of adolescence.

Recent studies dispute the earlier be-

lief that one who receives his first infection in adult life reacts less favorably to it than the child. Apparently, the human body can experience the benign primary form of the disease but once only. It has been shown by Myers and others that nurses from rural districts, who began training without any previous contact with tuberculous patients, and who showed, as a result of tuberculin test and x ray, no evidence of ever having experienced a primary infection, when exposed to tuberculous patients in the wards, would always develop the first infection type of the disease, regardless of their ages. In these cases, the course of the first infection was almost identical with that occurring in the child. However, in those who began training with evidence of having had their first infection some time during childhood, when tuberculosis did supervene in a small percentage of these, after variable periods of contact, it was always of the reinfection type.

The pathogenesis of the primary lesions, as I have described them, has been pretty well understood for over 15 years, and we are indebted especially to the investigative work of such men as Opie, McPhedran, Krause, and Chadwick for the demonstration and description of what takes place at this time, particularly from the anatomical standpoint. Within the past ten years there has developed an especial interest in the role of allergy in this connection and an attempt is being made to correlate previously unexplained phenomena with the factor of allergic sensitization of lung tissue following the primary infection. There will be no attempt made here to theorize on the relationship of immunity and allergy in tuberculosis. Such evidence as we have is in many respects contradictory, and there is still a wide lack of agreement among those who have made the subject a matter of especial study. Most of the experimental work has been done on animals and, while we have reason to believe that other mammals react to the first and reinfection types in the same manner as man, it is often difficult to

correlate the observations with the complex changes in human tuberculosis. We know that sensitization to tuberculin and increase in specific resistance are acquired at about the same time with the onset of the primary infection. As a result of this tissue sensitization, there occurs an intensified reaction to the implantation of tubercle bacilli at a later date. Parallel with this the forces of immunity under favorable conditions hasten destruction of the organisms, check the progress of the lesions, and start healing. These two processes parallel each other, but the exact relationship between them is not clear. Moreover, as healing of the lesion of the first infection proceeds, sensitization to tuberculin diminishes and may disappear as does the factor of immunity.

I should like to emphasize at this point a very practical aspect of this question which concerns prognosis in the relationship between these two types of tuberculosis. Disregarding for the moment those cases in which acute disseminated tuberculosis follows shortly after the initial infection (and those cases are relatively few in comparison with those in which it does not), the question has been put in this manner: Does the primary infection constitute an asset or liability as far as its relation to the adult form in later life is concerned? There is abundance of proof that the allergic state set up in the tissues by this first infection is a distinct liability when these tissues are faced with reinfection at a later date. However, there is also good evidence that a relative degree of immunity is conferred by the first infection, and that, in case of reinfection at a later date, the lesions, rather than being of an acute rapidly progressing type, are in most cases of a localized chronic type, such as is characteristic of the adult form.

One attempt to answer this question has been made by Myers and Stewart of Minneapolis, who have had abundant material to make this study with at the Lymanhurst School for Tuberculous Children. They have made observations

in thousands of children, including serial x-ray pictures of the chest made at frequent intervals and covering in many cases ten to fifteen years in the life of the child. These studies have afforded an opportunity to follow the sequence of events in a given case starting with the pre-allergic stage before there is a positive tuberculin reaction, throughout the exudative and proliferative stage of the first infection through the stages of partial resolution to the end results of healing and calcification in the involved areas. Many cases have been followed in this manner to the onset of the reinfection stage in the apical and sub-apical regions, with extensive involvement. As a result of their observations they conclude that a primary tuberculous infection (which produces tissue sensitization to tuberculin) does not confer significant protection, but alters the tissue resistance in such a way that, when a reinfection is experienced, instead of being able to repeat the benign primary form, the body is doomed to develop the adult form of consumption.

This is also important because the use of the BCG vaccine of Calmette, which has been popular in certain clinics on the Continent for many years, and which is being studied in this country, notably by such competent observers as Dr. William H. Park and his associates in New York City at the present time, rests on a belief exactly the reverse. As you know, BCG vaccine is an attenuated culture of live tubercle bacilli, which, under properly controlled conditions, is not expected to increase in virulence after being introduced into the body. Entirely disregarding for the moment the question of danger from virulence, (and that point is disputed by different observers), it is an established fact that it is a means of artificially producing the first infection, with the production of allergy to tuberculin. At a recent round table discussion conducted by the American Academy of Pediatrics, which brought together the leading investigators on this subject in this country, the opinions expressed on

the question of BCG vaccine are of interest. This group included a pathologist, a pediatrician, an immunologist, and an authority on public health and preventive medicine, all leaders in this country in their respective fields. The pathologist expressed himself as opposed to the use of a vaccine containing live organisms, but felt that a slight degree of immunity might with safety be conferred by dead organisms. The pediatrician did not consent to express an opinion. The authority on preventive medicine, who has made a particular study of the tuberculous problem, was definitely opposed to its use, and the immunologist suggested 25 to 40 years further observation before rendering a decision. The diversity of opinions is obvious, nevertheless, in spite of the fact that its users advocate its use only in selected groups and under certain specified conditions, it is apparent that there is one school, if we may call it that, represented by those who feel that a carefully controlled first infection is an asset, and that the protection so conferred outweighs in importance the dangers of an allergy to tuberculin so established. Then, there is another school which stresses the undesirability and danger of the allergy set up by the first infection and which tends to minimize the importance of the protective immunity produced. In the present state of our knowledge, BCG vaccine had better remain in the hands of special investigators until further study has determined its usefulness.

A careful consideration of our present knowledge of the relationship between tuberculosis in the child and in the adult points the way to the attitude with which treatment of the first infection should be approached. The uninfected child should be protected from an open case in the home, so far as it is economically possible. This is best done by removal of the open case to a sanatorium. Even if one were convinced that there is some protective merit in a first infection, the inability to control the dosage of bacilli and the course of the disease makes it extremely hazardous.

Wallgren of Sweden believes that rest during the acute stage of the primary infection may prevent tuberculous meningitis and miliary tuberculosis. He has recently reported a series of 166 autopsies in cases of tuberculous meningitis in which 82.6 per cent had very recent primary lesions. He also reports 60 cases of tuberculous meningitis in which the exact date of the first manifestations of the primary infection were known, and he found that in two thirds of the cases the meningitis developed within the first two months after the onset of tuberculin allergy. He finds that the younger the child the greater the risk of meningitis, and he feels that sanatorium treatment is indicated, at least during the first three to six months after onset of the initial infection. By separating cases diagnosed at the onset of the infection from further contact, and following a specified rest regime during the first 3 to 6 months after the primary infection was first manifest, he has appreciably lowered his mortality figures from tuberculous meningitis. Other investigators are not convinced that treatment, other than breaking contact, has appreciable effect on the death rate from complications.

The great difficulty at this stage is, of course, that most of the cases are not seen or recognized at the time of onset of the first infection. But, in our present state of knowledge, cases seen at this stage should be

(1) Removed from contact with an open case

(2) Kept in bed as long as the fever persists and as long as the blood sedimentation rate is increased

(3) Allowed gradually increasing exercise after symptoms have subsided until clinical and x-ray evidence of healing is satisfactory enough to enable him to pursue normal activity

After the stage of acute clinical symptoms has passed and healing, as shown by calcification in the affected areas in the x-ray, has begun, experience has shown that throughout the remainder of child

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Tuberculosis in Adolescence¹

ADOLESCENCE is that period of youth from 12 to 25 years of age. It marks one of the most important stages

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stages of human life: a period of emotional development, sexual adjustment, physical and mental growth, and a period of unprotected exposure to the world dangers. During these formative years 20,000 youths die annually in the United States from tuberculosis.

The incidence of tuberculous infection and disease in adolescence has been widely studied during the last few years. Chadwick, in the Massachusetts school clinics, found that at 10 years of age 28 per cent were infected and at 15 years 35 per cent were infected. McCain in his school survey in North Carolina found 21 per cent infected and 16 per cent that had active tuberculosis. Rathbun in New York State found 15 per cent of his school students with active tuberculosis, and Opie and McPhedren of Pennsylvania found active disease in 16 per cent. It is interesting to note that the percentage of active tuberculosis present in the youths in these different parts of the country was practically the same.

In a survey of 65,000 school children in Minnesota, it was found that 12 per cent of the children in the 5 to 10 year group reacted positively, and 22 per cent of the 10 to 20 year group were positive. 0.2 per cent of the 5 to 10 year group had the adult type of tuberculosis while 0.4 per cent of the 10 to 20 year group had this type of disease.

In all tuberculin testing surveys conducted, one thing is common and that is that with increase in age comes a higher percentage of reactors. This corresponds to the increased number of contacts which come to the individual as he journeys through life. First we have the home. Should a positive sputum case

exist there it is as a fountain of water which gently sprays its immediate environment to the point of saturation. Frequently, 100 per cent of the children become infected. On the other hand, children from non-tuberculous families may have as low an incidence of positive reactions as 1 per cent. With this high incidence of reactors there also goes a corresponding increase in active tuberculosis and fatalities. Myers in his book, "Tuberculosis Among Children," mentions as a striking example a family of nine children all infected by a tuberculous mother and all dying from tuberculosis before passing the period of adolescence. Before we knew that tuberculosis was infectious, these sad instances were explained away on the basis of heredity. It is interesting to recall in this respect the words of Portal, Professor of Medicine in the College of France in the 18th century. His statement follows: "In the 'Journal of Paris,' it was reported in the year 1780, that a young man twenty years old had contracted phthisis by using the belongings and especially a fur coat of his father who had died of phthisis. Would it not be more natural, instead of this, to think that the child had inherited the disease from which his father had died, a disease which also had carried off four of his uncles and that he had died of hereditary phthisis? And yet this observation which furnishes so slight a proof that phthisis is contagious has been cited in favor of this opinion. One undoubtedly would reduce many observations of this kind to their proper value if one would subject them to a thoughtful and impartial investigation." Thus wrote a thoughtful and learned professor of medicine. Death spared him the fate of facing Villemin's and Koch's works which proved beyond the question of a doubt the contagiousness of tuberculosis.

As we proceed from the home to the school we find another not infrequent

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source of tuberculous infection Jordon and Frost in their school surveys showed instances of tuberculosis spread from unsuspecting tuberculous teachers to non tuberculous children The spread of tuberculosis between room mates at school is not an uncommon happening The problem of the spread of tuberculosis in schools has become such a vital one that many cities are making it compulsory to have all teachers and other employees in the public schools tuberculin tested and x rayed for the protection of students

As the adolescent arm reaches out to encircle more contacts we find two particularly fertile fields for the obtaining of a tuberculous infection, courtship and marriage is one, and the hospital is the other

Every worker in tuberculosis can cite cases of one lover infecting the other with tubercle bacilli There is perhaps no more ideal method for disseminating infection than here and the old saying that love is blind is not without great truth We used to believe that marital tuberculosis was of no more frequent occurrence than that found in the general population, but Opie cites the work on marital tuberculosis carried out at the "U" of Pennsylvania which shows that if one partner has active tuberculosis, the other will show x ray evidence of disease in 50 per cent of the cases This, of course, is a far greater incidence of disease than is found in the general population

The role of the hospital as a breeding ground for tuberculosis has been forcibly brought to our attention by many investigators The nurse and the medical student play the principle parts in this tragic drama Heimback of Stockholm showed that 50 per cent of the probation nurses were positive to tuberculin, but that at the end of their nursing course 100 per cent were positive Geer found that 30 per cent of the nurses entering training at the St Paul City and County hospital reacted positively to tuberculin, but that at the end of 3 years 100 per cent of them were positive and 55 per

cent of them showed evidence of adult type of tuberculosis It is hardly necessary to state more statistics readily available, which verify the fact that hospitals are frequently as responsible for infecting a nurse as a tuberculous home is for infecting an innocent child

At the University of Pennsylvania, Hetherington, McPhedran, Opie and Landis found an alarming increase of tuberculosis in medical students from year to year Apical tuberculous infiltrations jumped from 4 per cent in the first year students to 20 per cent in the fourth year students Similar results were found by Myers at the University of Minnesota These investigations and many others have shown that the incidence of tuberculous infection and disease is much higher in the nursing and medical professions than in any of the other professions

Why does tuberculosis claim such a large toll of life during the period of adolescence? It strikes youth a terrific blow, killing many more at that fruitful period of life than any other disease.

Some of the habits of adolescence such as diet, fads, and improper clothing, as well as the physiological changes that occur, have received blame. We do not know whether they are guilty or not We do know, however, that the incidence of tuberculous infection is approximately twice as great during this period, as it is in the 5 to 10 year period We also know that with an increase in infections comes increased disease From this fact alone it is evident that we should find a mounting percentage of tuberculous disease in the teen age. Another important fact stands out and that is the type of exposure during adolescence which makes for repeated and prolonged exposures They are schools, intimate social contacts, hospitals, and other gathering places that provide contacts of daily frequency Large and repeated doses of tubercle bacilli implanted upon fertile and well oxygenated soil seems to lead to destructive disease Why it should be still a matter of controversy It is an interesting fact, however, that both can

cel and tuberculosis once they gain a firm foothold in young individuals lead progressively and rapidly to destructive lesions. In old individuals, on the other hand, they both take on the characteristics of a slow and chronic disease.

If we add to the two above mentioned factors, that is, fresh infections and prolonged and frequent exposures, the strenuous life of adolescence we find what seems to be a logical cause of the high mortality rate found in this age group.

The treatment of tuberculosis in the adolescent consists of

- 1 Prevention

- 2 Care of the Active Case

The prevention of the disease consists of

- 1 Improved general living conditions which permit less crowding and more wholesome environments. With decreased filth and poverty go decreased mortality rates from tuberculosis.

- 2 Early diagnosis, and the finding and removing of sources of tuberculous infection. Tuberculin testing surveys are a good start in this direction.

- 3 Sanatorium facilities for isolating positive sputum cases.

The treatment of destructive tuberculosis in the adolescent is essentially the same as that for any age group. The subject of collapse therapy, however, requires special mention. In view of the progressive nature of teen age tuberculosis, most authorities advocate the institution of pneumothorax treatments much earlier in adolescents than in older individuals.

The rapid spread of destructive tuberculosis in the adolescent chest demands local rest without much delay, and artificial pneumothorax provides this with the least amount of danger. If there is one thing to remember in the treatment of this type of disease, it is early active treatment as well as early diagnosis.

The tragedy of tuberculosis in youthful lives has been stamped upon every community. No city, county, state, or nation can say that this disease has never darkened its pathway, nor can any community say that by its good work it has under

control the tuberculosis problem. There are those places, however, that by a proper apprehension of this devastating disease, have risen to the occasion and instituted recognized valuable measures to help stem its destructive force. Those places have learned that the beginning of tuberculous disease is tuberculous infection and that a program for the finding and removing of sources of infection is of paramount importance in helping helpless adolescence. Those places have also recognized that sanatorium facilities are an absolute necessity for obtaining any far reaching success in such work. They have provided for their communities places for isolating and treating the tuberculous. How much better this, than the closing of their eyes to an explosive consumptive cough and letting it gently spray their own sons and daughters.

If we seriously contemplate the control of tuberculosis in the adolescent and are really desirous of cutting down its terrific toll of life in the best years of youth, we must face unterrified this fact, it requires the expenditure of a considerable amount of money. There is no lazy way out. What is necessary is an outlay of cold cash, taxpayers money, to provide such institutions as are a safeguard not to our pocketbook, but to the health of youth.

As the campaign against tuberculosis continues, more and more stress will be placed on the great importance of the x-ray film in this work. There is no single measure that can approach its value in determining the presence or absence of destructive tuberculosis. At the present time, many hospitals take a routine chest film of every patient that enters the hospital regardless of the diagnosis. In this way, no nurse is subjected to the care of an unsuspected infectious tuberculous patient without knowledge of the nature of the case. As this practice grows, more protection against tuberculous disease will be given the nurse and more patients will be diagnosed early enough to give

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Some Aspects of Differential Diagnosis

MUCH has been written of failure in the early diagnosis of Pulmonary Tuberculosis and the resultant defeat of

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therapeutic effort. On the other hand, little emphasis has been placed on the necessity of guarding, in our earnestness, against the too promiscuous diagnosis of the disease on the basis of signs and symptoms, often presumptive, but, as will be pointed out, not pathognomonic of tuberculosis.

Primarily, let it be said, the most important single factor in accurate diagnosis is an adequate history. It is the foundation on which the subsequent diagnostic structure rests and no part of the latter can be stronger than its base. But once established, one must be content to regard it as a starting point, and not seek to take a diagnostic short cut to a clinical conclusion on the basis of symptomatology, compatible with, but not pathognomonic of, tuberculosis. If the final diagnosis of tuberculosis is withheld until the structural lesion is demonstrated by radiographic or physical examination, or demonstration of the bacilli in the sputum, a much smaller number of patients will be unjustifiably diagnosed as tuberculous and a greater number of non-tuberculous conditions will be discovered at a time when therapy may be successful.

It is the purpose of this paper to review a number of chest conditions recently seen in hospital practice, illustrative of the necessity of establishing the diagnosis beyond reasonable doubt and not depending on any single finding, or group of findings, conclusive though they may appear on cursory inspection of the clinical data. Limitation of space will not permit the use of case reports.

Tumors of the thoracic cavity, including bronchiogenic carcinoma, merit special attention. The recent advances in thoracic surgery and roentgen-therapy

have greatly widened the possibilities of therapeutic success and have rendered the early recognition of these

tumors a gratifying task. Considered as a group, they may become evident as mediastinal masses, areas of pulmonary opacities, atelectases due to obstructed bronchi, or as cavities due to the breaking down of the neoplastic mass. Any of these manifestations may be confused with pulmonary tuberculosis. The bronchogenic group may cause bleeding before any physical or radiographic evidence is available. No condition illustrates more aptly the advisability of caution in the diagnosis of tuberculosis in the absence of a demonstrable parenchymal lesion or in the face of a persistently negative sputum. Bronchoscopic examination is indispensable, and often clinches the diagnosis. At times, thoracoscopic aid is necessary. Occasionally, the laboratory may provide a hint in that the sedimentation rate is very rapid, while the Schilling count shows slight or no shift to the left.

Abscess of the lung, usually found in the lower portions, may also occur in the upper lobes, and particularly in the chronic state cannot readily be differentiated radiographically from tuberculous cavities. Usually, however, these patients give a history of onset with suppuration and sepsis, and the sputum is negative. Patients with chronic upper lobe abscess cavities present a particular problem, since they are frequently diagnosed as tuberculous, and receive treatment for tuberculous cavities. The acute inflammatory process at the onset, usually, has obliterated the pleural cavity, rendering attempts at pneumothorax unsuccessful, with the result that phrenic nerve operations are done, which fail to affect the abscess, but succeed in interfering with drainage of the secondary bronchiectasis, and in making the patient

more miserable. Careful and complete histories, difficult though they may be to obtain years after the onset, and assiduous search for tubercle bacilli, would obviate many such mistakes.

Aneurysm of the aorta, eroding into the trachea or the bronchi, is frequently the cause of hemoptysis, and if the aneurysm is small, more particularly if the eroded area is small, the fall in blood pressure following the bleeding may permit the formation of a clot. In such cases the bleeding may be oft-repeated, and the history extended over many years. It is rare that such aneurysms are not radiographically demonstrable. They may be suspected in the presence of hemoptyses, negative sputum, and positive Wasserman reaction.

Sufficiently often to deserve mention, the phthisiologist is confronted with a patient complaining of slight cough, vesperal fever, loss of weight and strength extending over a period of four to six weeks. Occasionally rales are heard in one or both infraclavicular regions. Radiographically, no parenchymal lesion is visible, and the sputum is negative for tubercle bacilli. A complete history may disclose an antecedent chancre, general examination discloses generalized shotty adenopathy, skin lesions are often absent when the general manifestations are severe, and the blood Wasserman is positive. Should the patient be put to bed for tuberculosis on the basis of the history and rales, without corroboration by x-ray and sputum, a brilliant cure of tuberculosis would be recorded and another potential neurosyphilitic preserved.

Following hemoptysis, small amounts of blood dispersed throughout alveolar tissue may set up small patchy areas of pneumonitis, bearing a strong resemblance to tuberculous bronchopneumonia. Such lesions are seen in mitral stenosis, and various malignant and benign pulmonary and bronchial processes, and may lead to an erroneous diagnosis unless serial roentgenography reveals their rapid clearing within a few weeks.

Thickening of the interlobar septum,

especially in children, often leads to wrongly diagnosed tuberculosis. It has been shown that this finding is practically as common in tuberculin negative children as in those with positive tuberculin reactions. The absence of other evidence of active pulmonary disease, the negative tuberculin reaction, the absence of tubercle bacilli from sputum and stomach washings should convince one of the non-specificity of the lesion.

Tuberculosis in childhood presents an acute problem. It must be remembered that the outstanding characteristic of the disease before the age of fifteen years is the almost complete lack of resemblance to clinical tuberculosis, as most of us know it. Local symptoms are rare and systemic symptoms are slight. A child who coughs more probably has asthma or bronchiectasis. It is not unusual to see children treated for years for active tuberculosis, when such treatment was without reason. In the light of present knowledge, the *sine qua non* in the diagnosis of childhood tuberculosis should be the positive Mantoux or the radiographic demonstration of the structural lesion or discovery of the tubercle bacilli in the sputum, stomach wash, stool, or exudate.

Space does not permit an exhaustive discussion of the conditions outlined above, or of the many miscellaneous conditions which, because of the emphasis placed upon certain symptoms, most notably hemoptysis, may lead to an erroneous diagnosis of tuberculosis. It is of interest, however, to add a number of conditions which in actual practice have led to erroneous diagnoses: bleeding from gums, pharyngeal varices, non-specific bronchial erosion, fatigue from neurotic states, fallen arches, coronary disease, cough from left ventricular failure, and post nasal drip.

It is obvious that errata of judgment and opinion will persist as long as diagnosis depends on the relationship of the many variable factors utilized in reaching a clinical conclusion. Perhaps, how-

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Differential Diagnosis of Pulmonary Tuberculosis

From the Clinical Standpoint

IN THE TIME allotted to me for the presentation of the subject of Differential Diagnosis of Pulmonary Tuberculosis from a Clinical Standpoint, it is manifestly impossible to give all the distinguishing features about the diseases in question. In this paper I shall discuss the ulcerative types of tuberculosis in the adult and leave for another time the question of childhood tuberculosis and the pneumonic types, including acute miliary tuberculosis. It is presumed that all physicians know how to make a careful chest examination including the knowledge of the physical signs present in the normal right apex, for it is in this region that certain changes are elicited which lead many physicians to diagnose pulmonary tuberculosis when that disease is not present.

The diagnosis of pulmonary tuberculosis in the advanced stages of the disease would present no difficulties to any careful physician, but it is important to remember that many individuals who have signs and symptoms of advanced pulmonary disease are not suffering from tuberculous infection, therefore one of the very important steps is the proper examination of the sputum, which necessitates the examining of at least ten specimens of sputum within a period of three weeks and often it is necessary to have the sputum examined for organisms other than the tubercle bacillus. I recall a patient at Saranac Lake who was supposed to have had tubercle bacilli in his sputum, and who was examined at the laboratory of one of our metropolitan centers. The man died very suddenly and the post mortem examination revealed a ruptured aortic aneurysm without any tuberculosis being present in the lungs. Another illustration of this point is a case of massive atelec-

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tasis seen at the White Haven Sanatorium. It was the case of a young woman who gave a his-

tory of illness since early childhood. The physical signs and x-ray evidences were of an advanced right sided lesion. However, the sputum was negative, and by further study we were able to conclude that this was not a case of tuberculosis but one of massive atelectasis. Many, if not most, of the cases diagnosed in sanatorium and elsewhere as far advanced pulmonary tuberculosis with negative sputum for tubercle bacilli, are diseases of another causation.

Most physicians regard the importance of hemorrhage and pleural effusion without obvious cause as being great factors in the diagnosis of minimal pulmonary tuberculosis. Likewise, a previous history of several attacks of so-called typhoid fever and malarial fever are quite presumptive evidences of pulmonary tuberculosis. However, in the diseases which will later be discussed one will find that hemorrhage, pleural effusion, and fever are frequent symptoms.

There are several general factors which must always be given great consideration in arriving at a differential diagnosis. The first of these is that in pulmonary tuberculosis the disease is usually found in the upper half of the chest, although cases of basal tuberculosis have been definitely observed, in such cases tubercle bacilli should be discovered in the sputum before the diagnosis is warranted. A few months ago while on service at the White Haven Sanatorium I had four cases of basal tuberculosis, all of whom had tubercle bacilli in the sputum. Physical signs were limited to the bases and we also received negative x-ray reports of disease in the upper half of the chest. All diseases located in the lower half of the chest are to be considered as non tuberculous until

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definitely proven otherwise. Another almost invariable law is that when you have advanced tuberculosis in one lung there is practically always some evidence of disease in the contralateral lung. I do not wish to give the impression that tuberculosis is not to be diagnosed unless tubercle bacilli are found in the sputum for it is very obvious that the case with the favorable prognosis will generally be found in those who do not show tubercle bacilli in the sputum. Since the advent of lung collapse therapy, it is to be noted that more and more of the sputum positive cases are amenable to arrest.

At this time, a few words may be said in regard to the method of making a chest examination and I have found it advisable to employ auscultation first and percussion last as contrasted with the commonly accepted methods of procedure. Also, it is important to remember that no chest examination is complete unless the physician has properly used auscultation with cough to bring out rales. In eliciting physical signs it is best to begin at the base, comparing from side to side first and then from base to apex on either side.

In this modern day, no one questions the efficacy of proper x-ray examination, tuberculin testing, and all other procedures which may be necessary to complete diagnosis. X-ray examination is of the greatest of value in deciding the diagnosis of a lung condition, but there are limitations to the interpretation of shadows as seen in chest films. I doubt the ability of the roentgenologist to decide clinical activity by the appearance of a film. Recently I had the experience of receiving two reports from two competent roentgenologists on the same film of the chest of a patient. One roentgenologist diagnosed strands while his colleague reported that no strands were present, but that a nodule was to be seen. While I depend upon the x-ray to a large extent in the differential diagnosis of chest conditions, I think that the clinician should have both feet on the ground and should interpret the x-ray findings according to

the clinical condition as it presents itself.

With this preliminary report I shall give some of the distinguishing features of the diseases with which tuberculosis is quite often confounded. Many of the diseases which will be later enumerated can be better differentiated between if the proper interpretation of the x-ray film is made and a study of the sputum for organisms other than tuberculosis is completed.

Upper Respiratory Diseases Frequent ly diseases of the tonsils, pharynx, and nasal sinuses resemble pulmonary tuberculosis. Many such cases are to be found in most tuberculosis sanatoria. As a rule the cough is of years duration, more marked in the recumbent posture, and a large part of the sputum is brought up by hacking or postnasal dripping. Associated with this is nasal obstruction and a certain amount of toxemia as evidenced by temperature and increased pulse rate. In sinusitis, localized tenderness is at times elicited. Frequently, these upper respiratory diseases are associated with lesions in the bases of the lung and are never to be diagnosed positive for tuberculosis without the finding of tubercle bacilli in the sputum.

Cardiac Diseases The chief cardiac disease with which tuberculosis is often confounded is mitral stenosis and it is not infrequently observed that a patient with this disease is sent to a sanatorium. The characteristic murmur and thrill associated with enlargement of the heart should serve to identify such cases. In the cardiac diseases, dyspnoea is often a prominent symptom. Another frequent symptom is blood spitting or hemorrhage which may be present after endocarditis, pericarditis, or infarction. An example of the occurrence of cardiac disease and tuberculosis in the same patient was afforded by a rather recent study of an individual at the Abington Hospital. The clinician had made the diagnosis of mitral stenosis and tubercle bacilli had been found in the sputum. Upon physical sign and x-ray examination, definite lesions

in the upper lobes of the lungs were clearly defined

Chronic Bronchitis The factors which distinguish this condition from pulmonary tuberculosis are that the cough and expectoration have lasted for years with the maintenance of the general good health. These symptoms frequently develop after an attack of influenza or occur in individuals who are particularly susceptible to colds. The finding of whistling rales, either general or at the bases, should arouse suspicion that the condition is one other than pulmonary tuberculosis.

Bronchiectasis About two to five per cent of the patients sent to most tuberculosis sanatoria are not victims of tuberculosis but are individuals suffering from bronchiectasis. The distinguishing symptoms of this condition are the prolonged cough and profuse expectoration which is often influenced by posture. High blood pressure is frequently found and blood spitting is quite often observed. On physical examination the signs are usually found in the bases and bilaterally, but when unilateral they are more commonly found on the left. Study of the expectoration is negative for tubercle bacilli and another cause for the symptoms should be sought. X ray, especially if lipiodol is instilled into the bronchi is of great value in making the differential diagnosis. Proper bronchoscopic examination will likewise prove of great value in differentiating this condition. Upper lobe bronchiectasis occurs occasionally.

New Growths This includes a study of not only benign and malignant tumors of the bronchi, alveoli, and pleura, but also mediastinal tumors, aortic aneurysms, and Hodgkins disease. It is a characteristic of malignant disease of the bronchi that it often runs a benign course. The distinguishing symptoms are chest pain, dyspnoea, cough, expectoration, hemoptysis, and cachexia. In the more advanced stages the veins of the chest are enlarged from pressure upon the superior vena cava, also at times dilation of one pupil from pressure on the sympathetic nerve may be observed. Pleural effusion is at

times bloody and the expectorated blood of these cases at times resembles currant jelly. In cases where the sputum is negative for tubercle bacilli and the trachea is found pushed to the opposite side one should be suspicious of a new growth, especially if it occurs in a person over forty years of age. Another physical sign in the distinguishing of these diseases is that the dullness in new growth is more marked than one usually observes in tuberculosis. This condition should also be suspected when it is known that malignant disease exists elsewhere in the body and metastasis to the glands has been found.

Hyperthyroidism In exophthalmic goiter there is rarely any difficulty in distinguishing the condition from tuberculosis, but I recall a patient at the Kensington Dispensary for Tuberculosis on whom a diagnosis largely based upon the presence of cough, loss of weight, and rapid pulse was made. The clinician had overlooked the exophthalmus, the tremor and a slight enlargement of the thyroid. This patient was treated with surgery and the subsequent tests during the last four years have proven negative for tuberculosis. In mild cases of hyperthyroidism the mistake is frequently made of treating such patients as having only tuberculosis, although the two conditions may be found in the same patient.

Chronic Pneumonia A number of such patients are sent to sanatoria as cases of tuberculosis, but the negative sputum should always arouse a suspicion that the disease is one other than a Koch infection. Examination of the sputum reveals streptococci, diplococci, and pneumococci. A differentiating physical sign is that the disease is usually present in a lower lobe with the apices clear.

Interlobar Empyema This condition should offer little or no difficulty as it often follows after pneumonia or an operation. The patient brings up large quantities of purulent sputum which is negative for tubercle bacilli and the dullness is usually elicited in the region of the interlobar fissure.

Pulmonary Abscess This condition is usually preceded by an aspiration pneumonia which occurs frequently after tonsillectomy or as a septic pulmonary embolism after surgical intervention. In such cases the chief symptom is the expectoration of large quantities of sputum which is negative for tubercle bacilli. Quite often blood spitting or hemorrhage are symptoms and lead to the erroneous diagnosis. When the sputum is fetid, it makes the diagnosis of abscess even more reasonable.

Pulmonary Syphilis Pathologically this is an extremely rare condition, but in any case having pulmonary symptoms, a persistently negative sputum for tuberculosis, and a positive serological test for syphilis, this disease should be suspected. There is usually a slight disability and the course of the illness is slow. Dyspnoea of a slight degree is frequently present. One only has to observe a number of positive Wassermann cases receiving the therapeutic test with the subsequent clearing up of the pulmonary symptoms to be convinced that syphilis of the bronchi and lungs must actually exist.

Foreign Bodies Frequently, the history obtained shows that the individual has aspirated a foreign body. The physical signs are located at the base of the lung and the diagnosis is usually made certain by x-ray evidence.

Spontaneous Pneumothorax Not many years ago, practically all cases of this condition were considered as being due to tuberculosis, but we have since learned that many such cases, without a previous history of tuberculous infection, occur when there is no evidence of infection with Koch Bacillus.

Pneumoconiosis For this condition a history of the occupation is most important in making the diagnosis. Given an individual working in a dusty trade and presenting symptoms of cough, expectoration, and shortness of breath, one must always suspect this condition when the sputum is negative. Frequently, at a later stage, many of these dust infections are followed by definite pulmonary tubercu-

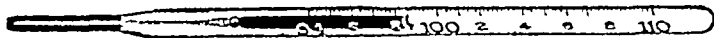
losis. It is to be born in mind that silicosis develops in those exposed to dust containing silica. Siderosis occurs in those exposed to iron oxide. Anthracosis presents itself in those working in an atmosphere of coal dust while asbestosis occurs in those working with asbestos. In the White Haven Sanatorium we are able to observe at any one time about fifty cases of either pure anthracosis, or the combination of this disease with tuberculosis. A roentgenologist, who does not know the history of the occupation of the patient, will frequently make a diagnosis of miliary tuberculosis in these cases.

Actinomycosis Sputum being negative for tubercle bacilli, other diseases must be eliminated by sputum studies. The differentiating feature of this disease is that microscopically small sulphur granules may be found in the sputum, while the fungus is revealed by microscopical examination. At times, local abscesses appear which may lead to a diagnosis of empyema. Physical signs reveal lesions in the lower half of the chest and the history indicates that the individuals have worked in contact with either straw or grain.

Pulmonary Blastomycosis This disease is rarely seen in this community, most of the cases in this country having been observed in and around Chicago. Often there are accompanying skin lesions and the careful examination of the sputum will reveal the organism.

Streptothricosis Many sanatoria at times admit these cases as ones of tuberculosis because slight hemoptysis is common. The other distinguishing symptom is that dyspnoea is frequently present. The general condition of the patient is apparently good and there is an absence of toxemia. An example of this condition is shown in the case of a young man who had been treated for tuberculosis in a sanatorium because of blood spitting. He reported at the Kensington Dispensary for Tuberculosis, where the sputum was negative for tubercle bacilli, and we were encouraged to study the sputum for other organisms, we found the sputum loaded with the streptothrix organisms.

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When writing please mention DISEASES OF THE CHEST

After potassium iodide therapy there was marked improvement of the patient in that the blood spitting almost ceased and there was a decided gain in weight. After a time, the patient discontinued treatment and the ultimate result is unknown.

Aspergillus Fumigatus This disease likewise simulates tuberculosis and is often detected when the sputum is examined for organisms other than tuberculosis. The history of occupation is of great importance as most of these patients have been handlers of flour meal, or grain.

Psittacosis This is another of the infections discovered through study of the sputum. The distinguishing feature of the disease is that the individuals have been handling parrots infected with the organism. Another factor is that quite often several members of the family are infected at the same time.

Broncho pulmonary Spirochetosis This condition is often known as Castellani's disease, and in the study of the sputum for organisms other than tuberculosis, the spirochets are found in large numbers. The characteristic symptoms of this disease are a high, continuous fever associated with marked cough, expectoration of fetid sputum, and chest pain.

Conclusions 1 Sputum is not to be

considered negative for tubercle bacilli until ten specimens have been examined and then thought should be given to other organisms as the cause of the disease under study.

2 Physical signs of advanced and extensive lesions in the chest with negative sputum are usually due to other conditions than tuberculosis.

3 X-ray evidence of extensive disease in only one lung with negative sputum should arouse suspicion of some cause other than tuberculosis as being responsible for the patient's illness.

4 Physical signs limited to the lower half of the chest should be considered as non tuberculous until tubercle bacilli are found.

5 Careful attention to family history, occupation of the individual, history of previous illnesses, and present illness will often point the way to the correct diagnosis.

6 It is not necessary to find tubercle bacilli in the sputum to make a diagnosis of tuberculosis, but other diseases should be excluded.

7 Physical signs elicited above the third rib and the fifth dorsal vertebral spines, when crackling rales are obtained, should always be considered as tuberculous until definitely proven otherwise.

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Fight Tuberculosis With Modern Weapons-

IN THE PAST, in which we are all so vastly interested against the disease, Pulmonary Tuberculosis—a disease

BY
FOSTER MURRAY, M.D.**
Brooklyn N.Y.

known for centuries as the Great White Plague—we have come to hear more and more in recent years of new or modern weapons employed with increasing degree of success. How successfully they have been employed may be judged from the fact that the death rate from this disease has been cut to about one quarter of what it was in the first year of the present century. This tremendous reduction in the death rate has truly not been just accidental, nor due to some occult or mysterious force, but may be safely ascribed in large part to the steady development and practicable utilization of a number of discoveries during the course of these and many preceding years.

Not all of the so-called Modern Weapons which we have learned to apply with such success are necessarily of recent discovery or invention. Some of them have been in use for many years but it is in their present-day application that they have become of incalculable value to the campaign. For it must be remembered that that part of the campaign which deals with the earliest possible discovery of the disease in man is just as vital to our warfare as the application of the many newer methods of treating the disease after the diagnosis has been made.

With this in mind let us consider the role of the microscope. Here is an instrument invented in the year 1590 by Zacharias Jansens of Holland which opened up vast new worlds for exploration and study. Without it, of course, accurate diagnosis would be impossible and

without diagnosis the campaign against tuberculosis would be as a ship without rudder or compass. It was not

until years later though, in 1882, when Dr. Koch of Germany by means of this instrument and by perfecting methods of staining bacteria first discovered the specific cause of Tuberculosis—the Tubercle Bacillus. With this discovery then, combining the use of the microscope and the means of differentiating bacteria by methods of cultivation and staining, we were given our first big formidable weapon—permitting us actually to identify the specific germ of the disease.

Again, it was in the year 1890 that this same Dr. Koch perfected his preparation of Tuberculin—which is now increasingly employed to detect the earliest presence of Tuberculosis infection. This important step is accomplished by means of injecting a small fraction of a cubic centimeter of the preparation into the skin. If the slightest degree of infection has already taken place, there occurs surrounding the site of injection into the skin, within forty-eight hours, a limited area of inflammation shown by a slight degree of redness and hardening. This is what is now known as the Mantoux Test—of paramount importance in revealing Tuberculous infection in children. Thus a discovery of some forty-six years ago has acquired immense prestige in our present-day campaign on the White Plague front.

Back in the year 1895, after years of experimental work, Professor Roentgen of Germany, introduced to an amazed world his extraordinary discovery of the x-ray. Here was an instrument by which the body was compelled to yield many of its inner secrets to the scrutiny of investigating eyes. Little time was lost in making useful application of this discovery to a study of diseases of the chest and what with the many technical improvements that have been perfected, it

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**Director Tuberculosis Division, Kingston Avenue Hospital, Department of Hospitals, City of New York.

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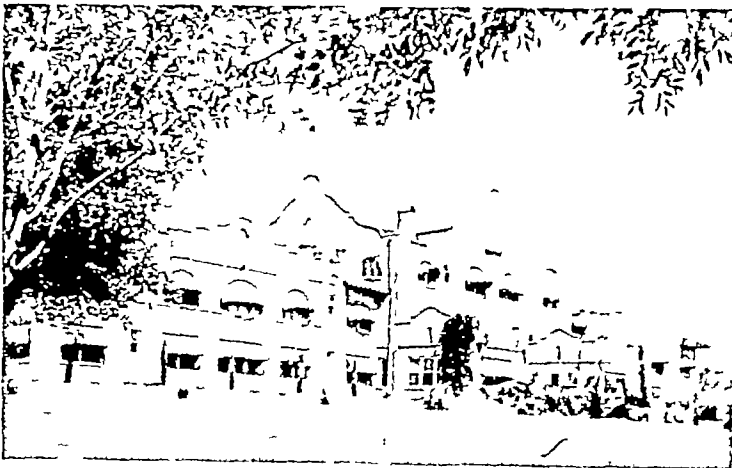
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has become indeed one of the Big Berthas in our warfare on Tuberculosis. Great as is its aid in diagnosing the earliest occurrence of tuberculous infiltration into the lung tissue, it is of possibly even greater assistance to the physician in helping him to evaluate the progress of the case, for by means of serial pictures taken at varying intervals he is able graphically to visualize the extent of the lesion, the character of it, the relative acuteness or chronicity of it, the destructiveness of it, and, what is most important, its general trend—whether it is progressing or retreating—getting better or getting worse. By it he learns quite accurately whether or not he is dealing with cavities—a vitally necessary bit of information because on such information he is most likely to base his decision on whether or not to employ collapse therapy. Also when collapse therapy is employed, by the x-ray picture or by the fluoroscope he is able precisely to determine the degree of compression of the lung, the number, the distribution, and the character of the individual adhesions present, if any, the changes in size of cavities and the amount and distribution of fluid—when present in the pleural cavity. Hence, we see that a discovery of some forty-two years ago has brought to us a most precious instrument, of incalculable aid not only in diagnosis, but also in prognosing and in guiding the physician during the long course of treatment. So much for the weapons employed in aiding the diagnosis of Tuberculosis.

Let us now consider the big weapons that are chiefly used in the actual treatment of the disease. Rest is the basic idea underlying all such treatment. Hence, that oldest of all institutions in the world—the bed—achieves a most prominent place in our present day armamentarium. Bed rest or horizontalization is utilized either alone or in combination with more radical measures. It has taken us all these centuries to grasp the primal importance of rest in combatting this disease, but there it stands today the preeminent weapon of defense. The majority of cases

without cavity formation progress to eventual cure by utilizing this measure alone. The majority of cases with cavity formation require in addition to general rest afforded by the bed, compression of the lung to insure complete obliteration of the cavity—for without obliteration of the cavity permanent cure can rarely be obtained. Thus, there has come into practice the various so-called operative methods of artificially collapsing or compressing the lung.

Of the operative measures employed to bring about collapse of the lung, the one most generally and usually first sought is that known as Artificial Pneumothorax—or the introduction of sterile air into the pleural space between the lung and the chest wall. The idea of collapsing a tuberculous lung by letting air into the chest was first conceived in the year 1822 by Dr. James Caeson of England. The idea was not well received, however, and fell into complete disuse until the year 1894 when Dr. Forlanini of Italy and, quite independently, Dr. John B. Murphy of Chicago, resurrected it and by determined advocacy started it firmly on its way to universal recognition. Even at that, it has taken this measure almost forty years of slow development to achieve its present popularity.

Artificial Pneumothorax is a comparatively simple procedure performed by introducing a small hollow needle, under novocain control, through the soft parts between the ribs into the space between the two layers of the pleura. As the air flows into the pleural space, the lung is separated from the chest wall and gradually made to contract down or collapse. The air thus introduced acts as a splint to the lung—preventing motion, and if put in under sufficient pressure actually compresses it so that even large cavities are progressively reduced in size and eventually obliterated.

Artificial Pneumothorax is employed in cases where one lung is fairly extensively involved with actual destruction of tissue or cavity formation and in which

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the opposite lung is considerably less involved and that preferably in an inactive state. It may also be used on both sides provided the diseased portions are not too extensive in either lung—a procedure known as bilateral pneumothorax. It is moreover employed to check profuse hemorrhage. The air introduced into the pleural space does not remain there permanently but becomes more or less rapidly absorbed. This necessitates repeated applications of the treatment at varying intervals until the time is deemed wise to discontinue the procedure—a matter of from two to five years depending on the extent of the disease process and the site and character of the cavities when treatment was first instituted, also, on the general condition of the patient, and on the persistent absence of tubercle bacilli from the sputum. In ideal cases, by stopping the treatments, the lung or lungs then gradually re-expand to approximately their former size, the original damaged areas contracted down and completely filled in with tough scar tissue, the rest of the lung slightly enlarging to fill the required space.

In those cases where Pneumothorax has been attempted and failed of attainment, some other method of achieving rest to the lung must be considered. The simplest of these consists of removing the phrenic nerve on the diseased side, which results in paralyzing the diaphragm of that side and causing it to rise in varying degrees up into the chest cavity. The paralysis of the diaphragm decreases the amount of motion to which the lung is subjected. The rise of the diaphragm lessens considerably the space within which the lung is housed, thereby causing that lung to be compressed by just that degree. Thus the loss of motion and the compression visited upon the lung serve to splint that organ and to promote the mechanism of healing. It is used also in conjunction with Pneumothorax, either on the same side or on the opposite, and sometimes used when Pneumothorax is about to be

discontinued. The operation is performed through a small incision above the collar bone under local novocain anaesthesia. To attain these same objects for only a temporary period the nerve is crushed. This procedure while it has been found to be helpful in a number of cases does not warrant universal application. It was first performed about the year 1910.

When for varying reasons none of these procedures can be successfully carried out, the more radical operations of thoracoplasty (rib operation) and apicectomy may be advised, provided the patient's general condition will permit. Thoracoplasty is usually performed in several stages and consists of removing a large portion of the ribs overlying the diseased tissues, thereby permitting the soft parts of the chest wall to cave in and so mechanically compress and relax the underlying lung. This compression of the lung becomes a permanent one and rest is thus continuously assured to the diseased part. It was first devised and performed by de Cereville in 1885. The operation Apicectomy is used to compress large cavities located in the upper portions of the lung. Here, some foreign material—such as paraffin, gauze, transplanted fat or muscle is introduced between the lung and the chest wall.

And so it has therefore come about that the microscope, the specialized methods of staining bacteria, the use of tuberculin as a diagnostic agent, the x-ray, the bed, Artificial Pneumothorax, the Phrenic Nerve Operation and the Thoracoplastic Operations constitute the chief of the Modern Weapons. Many of these are, indeed, old in origin but in their present-day application have become truly modern. It is most significant and it must be remembered that they have come down to us out of an endless host of so called cures and remedies, the most reliable measures to have survived the test of time. They represent to day, the most efficient means we possess toward eradicating the Great White Plague.

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TUBERCULOSIS IN THE CHILD ITS RELATION TO TUBERCULOSIS IN THE ADULT—(Cont from p 11)

hood the course of the disease is little influenced by treatment. As these foci even in advanced stages of healing still harbor live organisms the child should be under observation and an annual clinical examination and x-ray of the chest made. Sanatorium treatment is not indicated at this stage and the expense of maintaining preventoria is not justified in many cases except that the contact with the open case is broken for the relatively short period that the child is under preventorium care. Where home conditions are very bad the child is benefited in a general way by the improved hygienic regimen which he finds in the institution. In most cases he would benefit in a larger sense by removal of the open case to a sanatorium, permitting the child to have a normal home and family environment. The child who is put back into the same home environment, after a short period like 6 months in an institution, rapidly loses the benefits of the preventorium regimen, and is again faced with exposure to reinfection if the home conditions have remained unaltered. Where he can be placed in a preventorium to tide over the period during which disposition of the open case and improvement in home conditions is under way, the benefits are more permanent. Other than that, the treatment at this stage consists of a good general hygienic regimen.

The question arises as to whether the child with a primary infection is a practical source of danger to negative reactors, or those who have never experienced a primary infection. Although at times the bacilli can be obtained from stomach washings or sputum, it is unlikely that the actual spread of disease from these cases is of much importance. Even if it were considered ideal to separate these cases it would be practically unfeasible.

In families where there is an open case,

all members should be given a tuberculin if at any time they become positive reactors. It should also be remembered that test. Those who react positively should have a clinical examination and chest x-ray made and this should be repeated annually. Those who do not react positively do not require an x-ray, but should be retested once a year and x-rays taken. The gastrointestinal tract may be the portal of entry and in cases with a positive tuberculin reaction and no demonstrable foci in the chest x-ray, pictures should be taken of the cervical and abdominal regions, which may disclose calcified glands. Also, chest pictures taken in antero-posterior, lateral, and oblique positions are of more value than stereos in the case of children's chests, as they afford a better view of the hilar region where calcification is most often sought.

Our attention should be directed especially to watching for changes occurring in the teen ages. After the age of ten, the child with a primary infection should be kept under stricter observation, and physical examination and x-rays made oftener than once a year in suspicious cases.

In closing, then, it may be said, that we have, at the moment, enough definite knowledge about the etiology and pathogenesis of tuberculosis in the child, and its relation to tuberculosis in the adult, to form a sound basis for diagnostic criteria and therapeutic procedure. It is extremely important to keep abreast of these changing viewpoints because they influence our concept of all phases of tuberculosis. The continuation and completion of other studies, now under way, will tend to clarify many points and fill in gaps that now interfere with a completely rounded out picture of this relationship.

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TUBERCULOSIS IN ADOLESCENCE—(Continued from page 14)

them a more certain recovery. If society would only regard the routine chest X-ray of every individual from twelve years up as important as the fingerprinting of criminals then we would be a long way on the road to the control of tuberculosis.

—————(O)—————

SOME ASPECTS OF DIFFERENTIAL DIAGNOSIS—(Continued from page 16)

ever, we are too self-indulgent in seeking refuge behind this hackneyed sentiment to explain failure occasioned by not putting to use the facilities at our command. Despite the cries against the mechanization of medicine, there is little of personal error in a diagnosis confirmed by radiographic demonstration of cavity, and microscopic demonstration of tubercle bacilli.

—————(O)—————

ABSTRACT

G RICHARD, The Syndrome of Exophthalmic Goiter and Tuberculosis. *Rev. franc. d'endocrinol.* 12:199, 1934.

Richard brings together in this article the results of observations of various investigators and of his own which seem to indicate the existence of an interplay between activity of the thyroid gland and the course of a tuberculous process. He recalls that Moirin, in 1887, noticed improvement in 87 per cent of 348 tuberculous patients who had normal or hypertrophied thyroid glands, while in another group of patients with atrophied glands improvement occurred in 37.8 per cent. A similar correlation was established experimentally in laboratory animals by Charrin in 1898, Fingom and Griscom in 1909, Uhlmann in 1911, and Solis Cohen in 1911. Coulaud expressed the only dissenting opinion when he claimed that destruction of the thyroid gland in rabbits does not render the animals more susceptible to infection and that histologically the thyroid gland in tuberculous ani-

mals has a normal appearance. Richard refers to his own observation, made in 1907, regarding the relatively frequent coexistence of exophthalmic goiter and of incontestable manifestations of tuberculosis, and the usual benign character of the tuberculous process in such combinations. He was also impressed at that time with the rather mild nature of exophthalmic goiter in persons suffering from tuberculosis. He mentions also his observations of a dozen patients who showed a spontaneous tendency to recover from a tuberculous process after the syndrome of exophthalmic goiter became manifest. Similar observations were made by Lereboullet and Sabourin. Richard mentions finally the fact that the close relationship between hyperthyreosis and tuberculosis was sustained at the National Medical Congress held in Paris in 1934, thus affirming a view advanced thirty years ago by Moirin and shortly afterward by Richard himself.

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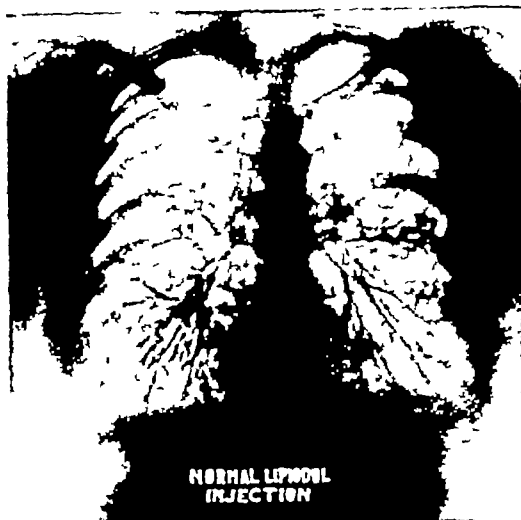
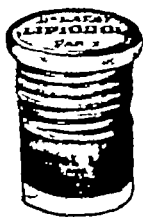
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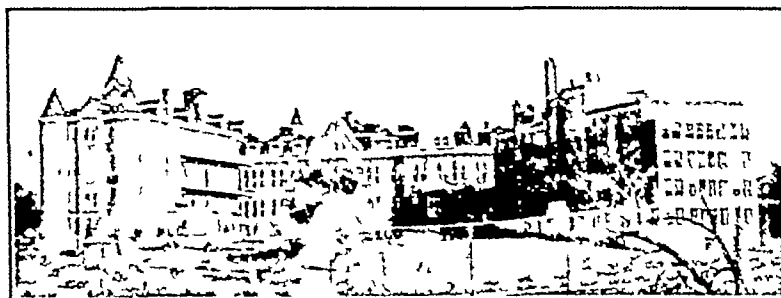
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MYRTLE AND VIRGINIA STREETS
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Editorial Comment

Tuberculosis Control DR JOHN H. PECK has recently stated that the control of Tuberculosis has provided the most formidable public health problem during all the ages. I am sure we all agree with Dr. Peck. In order to ultimately control Tuberculosis two essential principles must form the basis of the whole problem. One the prevention of the disease and two the treatment of those already infected.

The prevention of the spread of Tuberculosis can be had only by discovering all open cases and by isolation, treatment, and education, render them safe to their fellows. No case should be allowed to return to his home and community unless his sputum is bacilli free or in the opinion of his physician, he is thoroughly impressed with the danger of his infecting others and is a conscientious type. Tuberculosis should be a reportable disease with laws provided for its control. In some states there is an attempt to control the disease by the education and hospitalization of the early case, and the complete neglect of the open case, especially if the case be somewhat advanced. The error in the method should be corrected.

The second objective in the control problem is early diagnosis and early treatment. This early treatment should be carried out in Sanatoria, where the patient will receive adequate care, with rest

and proper food. The sanatorium beds should be provided by the state in the case of indigents and by the utilization of beds in private sanatoria when available. The open case should be given preference over the early closed case in every instance. The early closed case can be treated at home, if no beds are available much more to the advantage of the public health than can the open case.

When finally Tuberculosis control has arrived it will have arrived only by the diagnosis of all early cases, finding of all open cases, isolation of all open cases and proper and adequate hospital care provided for all types of cases, and the education of all concerned, the medical man as well as the lay public. C. M. H.

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Therapeutic Chaos In Bronchial Asthma -PART II

Treatment

Now what may be considered as rational therapy in bronchial asthma?

First of all, it should be remembered that practically every asthmatic patient starts his career as an allergic individual. If not checked in time, he will develop a secondary infection with either a sinusitis, rhinitis, polyposis, post-nasal drip resulting in bronchitis, bronchiectasis, emphysema and a possible atelectasis, or a combination of several of these. Therefore, all chronic asthmatics, no matter of how long standing or how complicated a pathologic process, should have the benefit of at least one complete and thorough allergic check up. Even though it is true that a majority of such cases are beyond the benefit of allergic therapy, still it is always worth while to give every patient the benefit of the doubt, because if definite allergy can be established, there is still hope, if not for a complete cure by desensitization, at least, for a marked improvement. The technique of allergic therapy will be left out of this discourse because it forms a subject by itself. I will here limit myself to non allergic therapy only.

The therapy of the asthmatic symptom complex combines allergic, preventative, dietetic, eliminative, medicinal, and climatic measures, as well as hydrotherapy, hyperpyrexia, and surgery. More frequently a combination of several of these is required.

Preventive

Remember, preventive therapy is the simplest, the easiest to carry out, the least complicated, the least expensive, and the one that gives the best results. Every asthmatic knows, or should know, what environmental influences and what food to avoid. Especially, should he avoid

BY

HENRY I. LEVITON, M.D.

Los Angeles, California

sudden changes in temperature, sudden chilling of the body, overeating, especially late at night, and food that is hard to digest. An over-loaded stomach is frequently the cause of an attack, therefore a patient should never permit himself to become constipated. Last, but not least, he should avoid cold, iced drinks, especially after an over exertion when the body is hot and moist.

Dietetic

Whether desensitized or not to known offending foods, every asthmatic knows, or should know, the foods that he is most sensitive to. In general, it may be said that all fried foods, especially duck and turkey, heavy gravies, cold milk, wheat, and eggs should be used sparingly. Too much of one kind of food and too large quantities at one time should be avoided. At this point, it is worth while to remember that antigenic foods (3), that is foods a patient is sensitive to, have a tendency to lower the normal gastric acidity or even to cause an achylia. On the other hand, compatible foods, that is foods not causing any allergic reaction, have a tendency to increase the secretion of free hydrochloric acid, thereby improving the general well being of the patient. This phenomenon is probably responsible for the prevailing idea that acid foods, or a state of acidity is beneficial in bronchial asthma. An asthmatic should eat four small meals a day, leave the table slightly hungry, and have his last meal at not later than six o'clock in the evening. It is also suggested that the patient have several glasses of hot water during the day and before retiring. A warm saline colonic flushing before bed time or a mild laxative will frequently prevent a nocturnal attack.

Climatic

Climate in bronchial asthma is one of

*Part I in September 1936 Issue

those dubious therapeutic measures that we doctors are frequently called upon to decide for our patients, and because we know so little about it, we just as frequently give the wrong advice. To send a patient to Arizona, Florida, New Mexico, or California, without having a previous thorough allergic check up, is nothing short of criminal. You might as well send the patient to Alaska or, for that matter, to the moon, since you would have an even bet in either case.

In general, it may be said that if one is dealing with a case of pollen allergy, the patient should be sent away from the offending pollen environment and it really does not matter where to, as long as he is away from that environment. All catarrhal patients with profuse expectoration and constant irritating cough, especially those that also have a renal disturbance, do best in desert climate. Any desert, any time. Patients with a tightness and constriction in the chest, scanty expectoration and difficulty in raising sputum, do best at the ocean, especially if there is also some cardiac complication. What such patients need most is moist air and enough oxygen. These most necessary ingredients can easily be had on an ocean front at sea level.

Hydrotherapy

Hydrotherapy has so often been misused and abused by ignoramuses, cultists, charlatans, and quacks that one actually hesitates to mention it as a therapeutic measure. Still, hydrotherapy has an honored place in the armamentarium of every physician and is of benefit in many ailments, including neglected cases of chronic bronchial asthma. Water, first of all, cleanses the body internally and externally, and as some sage once said, also eternally. It facilitates elimination from all orifices of the body, including the pores, prevents sedimentation of excretable material in body cavities, dilutes excretable substances, prevents dehydration of the body, and, most important of all, maintains the proper physiologic fluid balance of all body fluids,

thereby influencing the normal acid base balance. Death, in its ultimate, is really nothing else but pH balance running wild.

Now, what is the rationale of hydrotherapy in bronchial asthma? The congestive engorgement of the mucous membranes of the upper and lower respiratory passages and surfaces in bronchial asthma clogs up the very fine exuding orifices of the sero-mucus glands, thereby aggravating an already existing congestive process. By applying steaming hot blankets to such a patient's chest, we relieve the internal engorgement, and, by making such a patient drink several glasses of hot water, preferably with lemon juice, we dilute and "cut" the clogging mucus thereby facilitating expectoration. If we add to this a high saline colonic flushing to eliminate stasis in the elementary tract we are bound to get some results. I have still to see a patient who does not get some relief from this simple process. The limited space here does not permit a more elaborate and more scientific presentation of the subject of hydrotherapy.

Hyperpyrexia

Hyperpyrexia, as a therapeutic measure in chronic diseases, especially in lues, the various arthritides, and G C, has been ably discussed pro and con elsewhere by many capable authors. Therefore, I will limit myself here only to its applicability in bronchial asthma. The rationale of this form of therapy is generally based on the known bacteriocidal effect of heat. Now, if such ailments as lues, chronic arthritis, and G C, known for their resistance to the numerous forms of chemotherapy and serology because of their predilection of the deeper and more resistant tissues, do at times yield to hyperpyrexia, why not apply this same rationale to bacteria invading the superficial tissues, to bacteria known for their low grade infection, and to bacteria inhabiting the upper and the lower respiratory tract surfaces. Basing this theory on the above principle, I have applied hyperpyrexia as a therapeutic measure in

several cases of bronchial asthma with beneficial results. In one case, the result was so striking, and the improvement so marked, that I believe it worthwhile reporting here. Patient was fifty years of age, was allergic since infancy, had eczema when a child and in later years. Gave the usual history of paroxysms brought on by chilling, overeating, climatic influences, coming in contact with animals, etc. In other words, was allergic to foods, pollens, and epidermals. Had a limited test for allergy, which in non-experienced hands is worse than none.

Patient states that during the last two years he suffered severe, almost constant, attacks of dyspnoea, requiring almost constant use of asthma cigarettes and epinephrine. Lost his appetite as well as twenty-pounds in weight in four months. He states that his bronchi are obstructed by thick mucus. He had a constant non-productive cough. On August 16, 1934, he was given the first vitalizer hyperpyrexia treatment at the physiotherapy department of the Cedars of Lebanon Hospital. His temperature raised to 102.2, which was maintained for eight hours. No untoward effect during treatment was observed. General condition was good. That night was the first time in weeks that the patient did not require adrenalin to relieve an attack. Patient left hospital the following morning with a temperature of 99.2, pulse 102, respiration 20, and general condition good.

Four months later another treatment was given when a maximum temperature of 103.6 was reached. A third and last treatment was given two weeks later, December 28, 1934, when practically a similar temperature was reached. At this writing, sixteen months later, without change of environment, patient gained back his twenty pounds, has a good appetite, attends regularly to his business, is not using any drugs or asthma cigarettes, and states that he never felt so good in all his life. Of course, it is to be understood that before one undertakes such rather drastic therapeutic

measures one is to make sure that he is not dealing with cardiac, renal, or pulmonary pathology. It is my impression, that if one is dealing with a case of neglected allergy complicated with a low grade secondary infection, typical of chronic bronchial asthma, one is safe in using hyperpyrexia and one may expect beneficial results similar to those obtained in the case reported Hensch (4), of the Mayo clinic, describes a large number of diseases treated with hyperpyrexia. He states that out of twenty five asthmatic patients so treated notable remissions were noted in from one to seven months in seventy five percent of the cases, while further treatment induced subsequent remissions. This apparently is a worth while measure in intractable chronic cases, but should be carried out under proper supervision in a well regulated hospital.

Medicinal Therapy

The proper medicinal approach to this symptom complex depends entirely upon the understanding of the physiologic fact that allergy is a metabolic revolt, an attempt of the body machine to throw off the yoke of undigestible, unassimilable, and unmetabolizable substances floating in the blood stream. These substances comprise practically everything the human body comes in contact with and may be either inhaled, ingested, or absorbed through the body pores. The body attempts to throw off these foreign substances through the same channels, that is, through the mucous membranes of the digestive and respiratory tracts, as well as through the skin, hence our abdominal allergy, our asthmas, eczemas, and urticarias. Therefore, any method that will prevent absorption of these substances and anything that will increase their elimination is desirable. Experience has proven, time and again, the beneficial results of an occasional fast day in all allergic states. The rationale of such a day is explained by the alleviation of the burden on the digestive organs, by im-

proved elimination, as well as by the creation of more or less of an acid state, which some observers claim to be beneficial in bronchial asthma. Whether this explanation is scientifically correct or not, does not matter, but what does matter is the improvement so frequently noticed after a fast day and the aggravation of symptoms after a feast day. The metaphor that one man's meat is another man's poison, is literally true in bronchial asthma and the average asthmatic has learned through sad experience the need of separating his meat from his poison. While the allergists are searching the earth for a specific in each individual case in the mean time it is the duty of the physician to give the sufferer, if not a complete cure, at least temporary relief and not through sedation, but through elimination. Just to relieve an asthmatic paroxysm should be considered in the light of an emergency measure similar to the relief given in acute cholecystitis or renal colic. But just as the constant application of sedation to renal or cholecystic pain is criminal malpractice, so should the continuous relief obtained by the use of dangerous drugs in asthma be considered. Remember, the constant application of relief measures only, lulls a suffering asthmatic into a false state of security which frequently ends in tragedy. Sedatives especially opiates, should never be used during an asthmatic paroxysm, as there is always a danger of pulmonary congestion, if the bronchial secretions are suddenly checked. For quick relief of asthmatic paroxysms a 1/100 epinephrine inhalation volatilized in an all glass nebulizer is certainly a great improvement over the 1/1000, one C C hypodermic use. It is simpler, easier, better controlled, and more economical. Chlorbutanal in a five percent solution of volatile oil, as a volatilized inhalant frequently gives excellent results. For slow relief, especially for nocturnal paroxysms, I find the stock capsules of ephedrine 3/8 gr with amytal 3/4 gr most excellent. The slow vasoconstrictive action of eph-

edrine with the mild sedative effect of amytal gives the patient both variation and sedation. During the stage of quiescence, it is a good policy to give to every asthmatic the old and reliable alterative, potassium iodide. A mistake is frequently made when this splendid drug is given during a paroxysm and immediate results are expected. The benefit of the iodides is more in their eliminative than in their curative action. The same may be said about ammonium chloride. It is most useful as an expectorant. It keeps the seromucous gland orifices open, diluting the exuding mucus on the mucous surface of the larynx, trachea, and bronchi and thereby preventing congestion and further irritation or complete closure of the bronchioles. It gives the best results when administered in small doses over a long period of time. Such a regime will frequently prevent an attack. The drugs briefly mentioned here are to be used, one at a time, or in combination, this depending entirely upon the individual reaction of each and every case as well as upon the skill and good judgment of the individual physician.

Surgery

Speaking of the advisability of surgery in the upper respiratory tract, one unwittingly finds himself in the position of Shakespeare's "Melancholic Dane", and asks himself the question, "To operate or not to operate?" To take a definite stand about surgery of the upper respiratory tract in connection with allergy, is to frequently find oneself stepping on very thin ice. The debated question in such cases is "Does allergy precede or follow surgery?" The surgeon will say the first is true, while the allergist is frequently of the opposite opinion. To deal intelligently with this controversial issue and in order to give correct judgment, we have to refresh our memories about the physiology of the upper respiratory passages to understand the nasal flora, the role of nasal mucus and the action of the

(Continued to page 28)

Diagnosis of Cancer Of the Lung

THIS PRESENTATION consists of a brief review of twelve selected cases. Eleven of these cases are proved cancer of the lung, eight of them being primary, three metastatic. One case of suppurative lung disease is presented for its possible value in differential diagnosis. One case of cancer of the lung was successfully operated

BY

CHARLES O GIESE, M.D.

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worse, there had been a loss of twenty pounds in weight. For the past week there had been a distinctly foul odor to the sputum, which had also become bloody. No marked hemorrhage

Vomiting had been present during the past week. Sputum varied in amount and occasionally large quantities were expectorated with no relief of the general symptoms.

Examination Evidently a very ill individual, temperature, 101°, pulse, 120. Examination of the chest shows, on the right side, well-defined dullness, evidently outside from root to base, both anteriorly and posteriorly with marked diminution of breath sounds. There were moist rales heard over this area, not increased by cough. Trachea slightly to the right. Abdomen presents some diffuse tenderness, no masses palpable. Patient was sent to the hospital and seen in consultation with the late Dr. I. D. Bronfin of Denver. The diagnosis rested between lung abscess and malignancy. On March 11, 1929, artificial pneumothorax was instituted on the right for diagnostic and possibly therapeutic value. Two treatments of 300 c.c. and 500 c.c. were given with fair compression of the right chest, but no displacement or compression of the mass seen at the right hilus. Following the second treatment the patient became dyspneic and there was evidence of displacement of the mediastinum to the left. Closing pressure at the time of the last treatment was plus 5. To relieve the dyspnea it was decided to withdraw air and plus 8 was recorded on inserting the needle. Six hundred c.c. of air withdrawn gave neutral pressure. A further puncture secured foul smelling pus.

Diagnosis Malignancy of the right lower lobe with spontaneous rupture into the right pleura with resulting empyema. No metastases could be made out, but patient's rapid decline suggested metastases.

Autopsy Large tumor mass at the right root with ulceration and perforation in right pleural cavity. Many metastases in liver and kidneys.

Microscopic Diagnosis made by Dr. C. T. Ryder of Colorado Springs. Bronchogenic carcinoma of the right lower lobe, with metastases in liver and kidneys.

In the differential diagnosis between malignancy and lung abscess, it is important to remember that in lung abscess the expectoration of large amounts of foul smelling sputum is followed by marked temporary improvement. In malignancy no improvement is noted.

CASE 2

F. S., a cleaner and dyer, a male, aged 57, was seen in consultation with Dr. R. H. Kampmeier, formerly of Pueblo. He was first seen June 20, 1931, and died on July 10, 1931. The duration of illness, nineteen months.

Previous History Negative.

Present Illness Onset, eighteen months prior to being seen. First complaint, weakness

CASE 1

A. R., a contractor and driller, aged 57, was first seen by me on March 7, 1929, and died on March 28, 1929. The duration of his illness was five months.

Previous History Influenza in 1918 was followed by chronic bronchitis. This was worse during the winter months. The bronchitis was not sufficiently severe, however, to interfere with his work and general activities.

Present Illness In October, 1928, he had an attack which was diagnosed as influenza. He was rather ill for several days, following this, cough was increased. Patient began to lose weight and strength, cough gradually grew



Fig 1 A. R. Case No. 1, taken March 7, 1929

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and cough Twelve months after onset, expectoration was present Dyspnea and loss of weight, fifteen pounds Cough, spasmodic in character Expectoration, scanty, one frank hemorrhage of half an ounce In May, 1931, a diagnosis of aspergillus infection had been made from the sputum Patient had failed to improve on large doses of potassium iodide



Fig 2 F S Case No 2 taken June 29 1931

Examination Emaciated individual, marked lagging of left chest and extension of the normal mediastinal dullness to the left, most prominent at the second space anteriorly Over this area were heard sibilant rales, increased during inspiration No increase in rales after cough

Diagnosis Cancer of the left bronchus

Autopsy Small carcinoma extending upward and outward from the left root, encircling the upper lobe bronchus Some breaking down of this tumor and a small cavity filled with pus Culture from this pus showed aspergillus No metastases were noted

Microscopic Diagnosis Cancer of the left upper lobe

Points of Interest Small size of tumor, aspergillus recovered from the sputum, death from pulmonary hemorrhage

CASE 3

W S B, male, printer, aged 61, was first seen on August 9, 1933 He died on December 30, 1933 The duration of illness, two years

Previous History Influenza in January, 1931, with complete recovery

Present Illness In January, 1932, he had a diagnosis of influenza, more severe than his previous attack, without recovery or improvement Chief complaints, dyspnea, loss of appetite and strength, cough, profuse sputum, marked loss of weight, and pain in the chest

Examination Marked dullness over left root posteriorly Many moist rales Rales also heard at right base In September, 1933, enlargement of the axillary glands on both sides was noted Sputum became blood streaked and later foul smelling

Autopsy Carcinoma of the left root with extension into the vertebrae on this side with breaking down Small mass at the extremity of the right lower main stem bronchus, also carcinomatous and cavitated

Microscopic Diagnosis, by Dr C T Ryder Carcinoma of the lung and hilum nodes Metastases into dorsal vertebrae and axillary nodes

CASE 4

W D, a printer, male, aged 47, was first seen August 26 1927, and died January 28, 1928 Duration of his illness, thirteen months

Previous History Negative

Present Illness Onset, March 1927, with cough pain, and loss of appetite These symptoms have continued



Fig 3 W D Case No 4 taken November 9 1927

Examination Marked dullness at the right root with increase in dullness over the left root On December 24, 1927, 50 c c of bloody serous fluid was obtained from the right pleura On January 3, 1928 pleura again yielded bloody fluid No relief in symptoms A few cells characteristic of carcinoma were seen in centrifuged sediment

Autopsy Primary bronchogenic carcinoma of both roots No microscopic examination made

In this case there was a question of interlobar empyema on the left, excluded by the presence of a bilateral lesion and examination of pleural fluid

CASE 5

J A. M., a male printer, aged 29, was

seen November 1 1933 He died January 13, 1934 Duration of illness four years

Previous History Diagnosis of ulcer of the stomach or duodenum was made in 1928 Patient treated medically with improvement

Present Illness Onset February, 1930, with bloody sputum which has continued to the present time Pain in right upper abdomen, severe extends down the legs and is marked in the right arm Cough, moderate in amount



Fig 4 J A M, Case No 5, taken December 22, 1933

Examination Marked dullness over right lower chest, well limited A few bronchial rales G I examination revealed definite ulcer of the duodenum but no evidence of rupture Exploratory puncture of right lower chest failed to secure pus, the needle passing through a hard, fibrous area On account of the marked G I symptoms on January 15, 1934, an exploratory laparotomy was done and a large ulcer found on the first portion of the duodenum which was excised At the time of operation it was determined the liver was in normal position and of normal size with no evidence of abscess either within or above the liver

Diagnosis Carcinoma of the right lower lobe

Autopsy Carcinoma of the entire right lower lobe with involvement of the mediastinal glands No metastases were noted

Microscopic Diagnosis Same

Points of Interest Because of the presence of ulcer in the G I tract there was the possibility of its rupture with resulting subphrenic abscess The irregular, septic type of temperature together with the dense shadow at the right base were confusing

CASE 6

W E B, aged 69, male, printer, was first seen August 20 1932 He died January 21 1933 Duration of illness three years and five months

Previous History Negative

Present Illness Onset, 1929, with substernal pressure, pain and dyspnea In August, 1931, he was examined at Ford Hospital in Detroit Bronchoscoped, tissue was removed Diagnosis, bronchogenic carcinoma A course of x-ray treatment was instituted

Examination Marked dullness at the right base with absence of breath sounds No change in condition until January, 1933 At that time marked increase in cough and expectoration of bloody fluid Aspirated 125 cc of fluid from the right pleura without appreciable relief

Autopsy Five hundred cc bloody fluid in right pleura In the right lower main bronchus about two inches from the bifurcation was a hard, well defined mass extending posteriorly and laterally The mass surrounded the right lower bronchus, producing stenosis but not a complete occlusion

Microscopic Diagnosis, by Dr C T Ryder Bronchogenic carcinoma of the right lung

Points of Interest Diagnosis by biopsy seventeen months prior to death No change in condition for a considerable period

CASE 7

F G, male, aged 61, pharmacist He was first seen March 25, 1933, with Dr C F Stough, Colorado Springs Died, April 20, 1933 Duration of illness, seven months

Previous History Negative

Present Illness Onset, September, 1932, with pain in the chest and marked dyspnea Aspirated two quarts clear fluid from the right pleura which failed to relieve dyspnea Following this he was frequently aspirated of amounts from 1000 to 2000 cc without more than temporary relief Opiates required for relief of pain Shortly before death, aspirated fluid became bloody



Fig 5 F G, Case No 7, taken September 20, 1932, before aspiration



Fig 6 F G, Case No 7 taken September 22 1932 after aspiration

Examination Right chest flat apex to base with all physical signs of fluid in the pleura

Autopsy Right pleural cavity filled with cloudy, bloody fluid Pleura generally and markedly thickened Visceral parietal and diaphragmatic portions about 2 mm thick and showing a net-work of ridges and nodules of the same consistency Right lung showed carcinomatous involvement with no ulceration Many metastases in the liver

Microscopic Diagnosis, by Dr C T Ryder Carcinoma of the right lung, right pleura and liver, the picture corresponding very closely with pleural endothelioma

There is a question whether the origin of this tumor was in the pleura or in the lung with marked pleural extension

CASE 8

J S T, male printer, aged 71, was first seen July 18, 1934 He died October 21, 1934 Duration of illness, four months

Previous History Negative

Present Illness June 15, 1934, severe pleuritic pain in right chest with cough and bloody expectoration Sputum continues to be bloody Constipation marked No history of vomiting or tarry stools

Examination Very ill individual with dullness at both apices, more marked on the left Sibilant rales heard over entire chest Abdomen shows marked fullness in upper mid-portion with considerable tenderness Patient too ill to be examined fully

Autopsy Tumor growth about three inches in diameter in the left lung At the head of the pancreas was a definite tumor growth, considered primary, and in the spleen a single area of metastasis Liver, filled with small tumors

Microscopic Diagnosis Primary adenocar-

cinoma of the pancreas, metastases to the spleen, liver and left lung

Points of Interest First symptoms were referable to metastases and not to primary tumor

CASE 9

J H J, male printer, aged 67, was first seen January 23, 1928 He died on September 25, 1933 Duration of illness, one year

Previous History Negative

Present Illness For some months, muscular soreness in arms Slight incontinence of urine



Fig 7 J A T Case No 9 taken June 23 1930



Fig 8 J H T., Case No 9, taken January 21, 1933

Examination Chest negative Blood pressure, 200/90 Diagnosis, hypertension, chronic prostatitis In September, 1932, he had marked shortness of breath Blood pressure 110 systolic Chest examination negative, abdomen, large movable mass in right upper abdomen Diagnosis, malignancy of the right kidney with metastases to the lungs

Points of Interest At no time cough or expectoration, dyspnea being the most prominent symptom

CASE 10

L Mc, a male printer, aged 52, was first seen December 23 1929 He died on May 4, 1930 Duration of illness, eleven months



Fig 9 L Mc, Case No 10 taken December 27, 1929

Previous History Negative

Present Illness In June, 1929, hoarseness and swelling of right side of neck and loss of weight and appetite

Examination Marked enlargement of cervical glands on the right Chest showed scattered areas of dullness, but no rales

Diagnosis Malignancy of the right side of the neck with metastases to the lungs

Autopsy Malignancy of the right side of neck with metastases to the lungs, liver, spleen, kidneys, abdominal glands and mesentery

No microscopic examination

Points of Interest No expectoration Extensive metastases

CASE 11

C E H, a male printer, aged 43, was first seen September 9, 1933 He died October 28, 1934 Duration of illness, eighteen months

Previous History Negative

Present Illness Onset, April, 1933, with swelling in the jaw from abscessed tooth Following this sudden pleuratic pain in the right side Sputum streaked with blood, fever, severe cough, expectoration, mucopurulent in charac-



Fig 10 C E H, Case No 11, taken September 11 1933



Fig 11 C E H, Case No 11, taken October 22 1934

ter with distinctly foul odor Loss of weight from 125 to 97 pounds

Examination Slight dullness in right upper chest with moist rales suggestive but not pathognomonic of pulmonary tuberculosis Patient had remissions with normal temperature and improvement in general condition April 3, 1934, artificial pneumothorax was instituted Some improvement with decline in temperature and decrease in the amount of sputum Marked exacerbations with high temperature

and profuse sputum. In October, 1934, severe pain in right chest, cyanosis, temperature, 103°. Air and purulent fluid were aspirated from the right pleural cavity without relief and permanent drainage instituted by trochar.

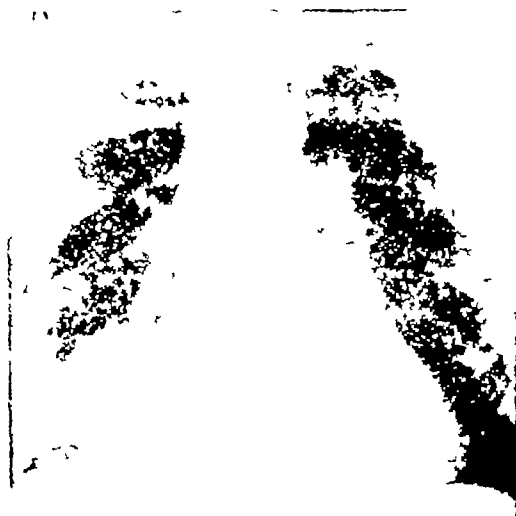
Diagnosis Malignancy of the right upper lobe with rupture into the right pleura.

Autopsy and Microscopic Diagnosis, by Dr C T Ryder. Lung abscess, chronic pneumonia, empyema. No evidence of malignancy.

Points of Interest The marked increase of the apparently consolidated area with sharp outlines as seen in the x-ray plate and the failure of compression by artificial pneumothorax led to the erroneous diagnosis of cancer of the lung. The marked remissions and exacerbations, if carefully considered, should have led to a diagnosis of suppurative disease rather than malignancy.

CASE 12

W C, an oil operator, aged 54, was first seen on January 10, 1935. The duration of his illness at that time was five months.



2-5/35

Fig 12 W C Case No 12 taken February 25 1935

Previous History Appendectomy 1912. Suppurating cervical glands, in 1912, proved to be non-tuberculous. Gastric ulcer in 1919, permanently relieved by diet, tonsillectomy, 1933.

Present Illness In August, 1934, noticed occasional blood streak in sputum with cough. Cough increased by exercise and more particularly by bending forward. No frank hemorrhage.

Examination Sibilant and a few moist rales at the extreme right base. Slight dullness. Auscultatory signs increased by voluntarily producing cough. Bronchoscopy not satisfactory. No tissue removed. X-ray findings grew more pronounced.

Diagnosis Carcinoma of the right lower lobe. Lobectomy by Dr R D Churchill of Boston was followed by apparent recovery.

Conclusions

Progress of cancer of the lung may be slow, but definite periods of improvement are usually lacking. Lung abscess and other suppurative conditions improve after periods of profuse expectoration. Physical examination shows some differences from findings usually seen in pulmonary tuberculosis which comprises the major portion of pathologic chests. Sputum examination is valuable in excluding tuberculosis and other infections. X-ray is of greatest value in diagnosis, particularly if oblique and serial plates are available. Bronchoscopy is helpful in a small percentage of endobronchial growths. Exploratory puncture with recovery of pleural fluid or broken down tumor, valuable. Negative puncture is also valuable if evaluation of the density of the tissue penetrated is carefully considered.

Pleural effusion contraindicates surgical removal.

ABSTRACT OF DISCUSSION

C T Burnett, M.D. (Denver) It is interesting that Dr Glese should encounter eight cases of primary cancer of the lung during an ordinary period of a man's active work. Dr Bronfin reported in this Society two years ago, nine cases that he had encountered in the National Jewish Hospital during his lifetime.

Dr Glese hasn't said anything about the increased incidence of primary cancer of the lung. Only a short time ago it was thought to be an exceedingly rare condition. Lord, in his book printed in 1925, found eight cases from the Massachusetts General Hospital in 4704 autopsies. He had had eight cases in his private practice. In other words, a man with a very extensive practice in New England, very largely limited to pulmonary diseases, had encountered only sixteen cases. Goltz, from the University of Minnesota, found that there were no cases reported prior to 1912. He notes a ten-fold increase since 1920.

Suffice it to say that for some reason cancer of the lung is a much more important clinical condition than it was a few years ago. No doubt the x-ray has helped us, because most of these cases are first diagnosed on the basis of x-ray without biopsy proof.

There may be some other factors. There has been a good deal of discussion as to why, aside from our diagnostic improvements, we may be encountering more primary carcinoma of the lung. Influenza, with the epidemic of 1918 and

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Convalescence From Tuberculosis And Its Dangers

UNDER this title I propose to discuss a group of patients who in the past and, indeed at the present time, are in

BY
JOHN B. HAWES, 2nd, M.D.
Boston, Mass

rather an unfortunate position as far as their treatment is concerned. In no other condition have greater advances been made during recent years than in the treatment of the patient who is sick with active tuberculosis. Not only has the value of prolonged bed rest been finally made clear to the general practitioner, but likewise the advent of collapse therapy has brought light out of the darkness to an almost miraculous extent. At the present time, in many sections of the country the patient who comes down with a hemorrhage or who is running a high fever and a rapid pulse and who is in other ways actually sick is given good treatment in the great majority of cases. And at the other end of the list comes that group of patients—the lucky ones—whose disease has been arrested or is at least quiescent. For them workshops, farm and industrial colonies, placement bureaus, vocational training, and rehabilitation schools are hard at work all over the country to help get them back on the job. God speed them in their efforts.

But there remains the group to which I would call attention here, who are not getting what I would call a square deal. "When the devil was sick, the devil a monk would be" applies very well to this whole subject. When the average man or woman suddenly has a large hemorrhage, or is finally persuaded by his doctor, or by looking at his own x-ray, or in some other way that he is really sick, he is pretty well scared and usually is only too willing to go to any lengths to take proper treatment. He goes to bed in a sanatorium or not where he is under constant and close supervision by his physician. Years ago, when I was in charge of the Clinic for Non Pulmonary

Tuberculosis at the Massachusetts General Hospital, I gave tuberculin to hundreds of patients with tuberculous

glands, kidneys, eyes, and other non pulmonary lesions. These patients came once or twice a week to the clinic where they sat down and had a personal talk with me or with my assistant and went over with us all the details of the past week which each one kept jotted down in a record book. In looking back over this experience I have rather come to the conclusion that most of these individuals would have done just about as well if I had given them injections of sterile water instead of tuberculin and that what really brought about the improvement which took place in the vast majority of the cases was the fact that they saw, at frequent intervals, their physician, who went into every detail of their lives at home and were thus constantly under his watchful eye. Today, although no one more than I appreciates the wonderful thing which pneumothorax has done in the treatment of tuberculosis, I am not at all sure but what a large part of the benefits which accrue to the patient who has his lung collapsed is due to the fact that he must see, at frequent intervals, his physician, for refills, who thereby knows intimately exactly what sort of a life he is living and advises him in regard to the various problems in it which are bound to arise. Those patients who are taking pneumothorax treatment at home after they leave the sanatorium or hospital are indeed the lucky ones, but, unfortunately, at present at least, they constitute only a small proportion of this group.

The late Dr. John Bryant did a very real service here in Boston by calling attention to that neglected period of convalescence following surgical operations. The surgeon performs a brilliant operation and the patient with his help, but

more often that of his assistant, and of still greater importance, that of his nurse, recovers splendidly and after paying the hospital bill (and sometimes the surgeon's) goes home. Here, despite the loving care of friend wife, the bottom too often drops out of everything. In some cases the family physician does not know he has returned home and in others the patient does not feel that he is or should be sick enough to need his care any more. Thus many decisions are left to be settled and too often wrongly, by the patient himself, who should be the last one in the world to do this. Thanks to Dr. Bryant the situation I believe, in this regard is much better than it was.

But in tuberculosis this convalescence lasts for many months instead of for a few days or weeks. While I believe most firmly that every patient with tuberculosis should spend part of his time at least in a sanatorium, the fact remains that altogether too many doctors—general practitioners and specialists—feel that their duty is done and well done when they have filled out and filed an application blank for their patient's admission to a state or county institution and have finally heard that he has been admitted. On the other hand, it is undoubtedly true, particularly at resorts for private patients who are paying their own way, that the sanatorium men in turn are chiefly interested in the patient's immediate welfare and not in how he will be the year or many years hence. I would maintain, believing as I do, most sincerely in sanatorium treatment, that the most important part of the patient's treatment comes before he is admitted, which means early diagnosis, and after he has left the sanatorium, which means prolonged and detailed supervision. Miss Bernice W. Billings, for many years secretary of the Boston Tuberculosis Association, of which I for as many years have been President, once asked me how long after a child's discharge from our Prendergast Prevention torium should that child be visited at

home by our after-care worker. My immediate and prompt reply was "Until the child dies of old age or from some other cause."

At the present time the poorer the patient the better the treatment he is apt to receive as far as close medical supervision during this convalescent period is concerned. It is unfortunate but true, that in too many instances patients who have paid perfectly good money for their treatment at some sanatorium or health resort are neglected during this vital period of convalescence. During the past 25 or more years I have sent hundreds of patients to resorts all over the country and I invariably receive from the doctor in charge a letter giving the details of the patient's physical condition, while sometimes later on I am fortunate enough to receive one or more communications of the same kind. But when the patient is discharged from the sanatorium and returns to me on going back to his home (if he does so return) I do not feel that he has received anything like adequate training as to what he should do for the next six months or a year in order to hold the gain which he has made while taking the cure. The majority of patients have not had impressed upon their minds the fact that the treatment of tuberculosis is a long-term investment and that their doctor is not so much concerned with their immediate future as he is with how they are going to be one year, five, or ten years hence.

Some twenty or more years ago when I was Secretary of the State Tuberculosis Commission in Massachusetts, I devised a system of discharge letters for the state sanatoria under the supervision of our Board, which system I believe is still in existence. On discharge of any patient from a state sanatorium a letter is automatically sent to the local Board of Health and to the patient's family physician going over the facts as regards his lungs and his general condition with a few words of advice as to

the future. How much good this does I am not sure, but it certainly does no harm. But whether such a letter does no good or much good, I believe depends almost entirely upon whether or not the patient is followed up in his home and upon the quality of this follow up work.

Private patients who go back to their family doctor get little or none of this. The average patient has not been taught to recognize the value of constant medical supervision and can see no reason why he should go to his doctor and pay him money for an examination and advice about his own condition which he is inclined to feel he knows more about than any one else. On the other hand, doctors are naturally diffident about doing anything which could be construed as "gunning for practice." It has only been of recent years, for instance, that I have felt that my own position in the medical

community was such that I could write a somewhat peremptory letter to every patient of mine whom I knew had returned from the sanatorium, to the effect that he or she must report to me at once and should continue so to report at least once a month regularly for 6 months or a year and at longer intervals for an indefinite period. It takes time, tact, perseverance, and, above all, willingness to make oneself unpopular to get this across to many patients. I remember distinctly talking with a trained nurse whose work consisted in looking after young children at a girl's school who had had a positive sputum and a long sanatorium experience and who could see no conceivable reason why she should come and let me examine her at least twice a year!

To make this whole process of supervision of the discharged sanatorium patient more effective and likewise to im-

RECORDS OF JOHN B. HAWES, 2nd, M.D. WEEKLY REPORT

REPORT OF _____ for week ending _____

MAIL THIS REPORT EACH WEEK OR AS DIRECTED TO DR. JOHN B. HAWES, 2nd,
330 DARTMOUTH ST. BOSTON, MASS.

Temperature and Pulse while at rest at approximately 4 p. m. and 8 p. m.

	P. M.	MON	TUE	WED	THU	FRI	SAT	SUN
Temperature	4 00							
	8 00							
Pulse	4 00							
	8 00							

Amount of coughing and raising

Sleep

Number of hours at rest

Gain or loss in weight, if any

Bowels

Appetite and digestion

Exercise

Physical-walking, Driving

Mental-Study, Serious Reading

General Feeling

Recreation

Strength, Energy

Questions

(FOR ADDITIONAL QUESTIONS OR REMARKS USE REVERSE SIDE)

Hemoptasis—Its Significance And Cause

HEMOPTASIS is a symptom which strikes terror in the patient and to say the least, gives the physician a profound feeling of helplessness. Hemoptasis in its true sense is restricted to bleeding below the larynx. For purposes of proper treatment, it is necessary that the origin of the bleeding be determined.

The correct diagnosis of the cause of a hemoptasis is not always an easy one. Many practitioners treat it lightly and tell the patient that it is from the throat and will soon clear up. Many times it does clear up, but the patient presents himself to the specialist months or years later with an advanced disease. The diagnosis should be cleared up as soon as possible. It is a serious wrong to the patient to treat it lightly. Pulmonary hemorrhage varies from a dram to a severe and rapidly fatal loss of blood. The blood may come up with each cough but there may be no cough and the blood wells up into the mouth.

Etiology

Pulmonary tuberculosis is generally thought to be the most common cause although Vinson found that hemorrhage was most frequent and severe in bronchiectasis. In the author's experience, this has also been true.

Frank hemoptasis usually occurs in the advanced lesions with cavitation, the blood vessels coursing the cavity have been suspended and weakened by the excavation around them and are broken either by exertion or erosion. Not rarely, the hemoptasis occurs as an initial symptom. Here the tuberculosis usually is an incipient lesion and usually cannot be detected except by x ray.

Bronchiectasis causes profuse hemoptasis and is not an easy diagnosis to clear up, because of the lack of roentgen evidence of disease. The physical signs, when present, are usually at the base.

BY

WILLARD J. DAVIS, M.D.
Rockville Center L. I. N. Y.

Bronchiectasis may be due to such familiar causes as post-pneumonic, pertussis, measles, enlarged bronchial glands, and often foreign bodies aspirated into the respiratory tract. The diagnosis can be clarified by the use of contrast medium.

Passive congestion due to chronic cardiac diseases causes hemoptasis—especially mitral diseases and endocarditis, the latter usually causing infarcts of the lung. The physical examination in these cases many times does not exhibit a marked cardiac murmur or rales in any part of the lung fields, nor is there always a history of previous cardiac disease. The roentgen evidence also may be confusing, because of the engorgement showing in the plate which can easily be confused with an acute infectious disease. The therapeutic test of rest and digitalis will clear the diagnosis.

Many times pneumonia is ushered in with a brisk hemorrhage. This is also true, but to a lesser extent, in bronchio-pneumonia especially the influenzal form. Lung abscesses and the particular gangrene of the lung generally cause hemoptasis to a larger or smaller extent. Abscesses located in the apex are easily confused with tuberculosis and will have to be determined by serial sputum examinations.

Spirochetosis is a much more frequent causative organism than is generally believed. The fetid, sweetish smelling sputum is usually caused by the spirochete combined with fusiform, vibrio, and staphylococci.

Malignancies of the bronchi and lung may also cause hemoptasis, but usually not the massive hemoptasis of the other diseases above listed. Less frequent causes are ulceration of the larynx, trachea, or bronchi, excessive granulation tissue in the bronchi following acute respiratory

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Rehabilitation of the Tuberculous

ONE OF THE WEAK links in our present program for the treatment of the tuberculous is the after care of the patient

BY
MURRAY KORNFIELD
El Paso, Texas

The following episode is a common occurrence between physician and patient. Mr. A. has succeeded in arresting his tuberculosis and his physician advises him to secure a light, easy job and to work for not more than three or four hours a day. If Mr. A. is not able to obtain such employment, that is where his troubles begin. He is certainly not in a condition to accept a full time job or compete with a healthy individual in holding that job, nor would his prospects of obtaining a job be bright, if it were made known to his employers that he had just recovered from tuberculosis. Here we have Mr. A. with an arrested case of tuberculosis. What are his prospects of maintaining his arrest?

Those of us who have seen thousands of patients leave the sanatoria of this country with an arrest of their tuberculosis only to be returned with a reactivated condition, disheartened, and discouraged, cannot lightly dismiss this needless suffering and waste of life.

The following figures are reprinted from "*The Texas Chaser*," July 1935: "from approximately 125,000 patients discharged from 588 sanatoria of the United States annually, it is estimated that one out of every five patients are returned to the sanatorium because of a reactivation from tuberculosis." These figures do not include those patients who have had a relapse and have not returned to the sanatorium for further treatment. Allowing the same ratio for these patients the total number of patients who suffer a relapse from tuberculosis, would be about 50,000 annually. On the basis of \$78,000,000.00 spent each year on sanatorium care in this country, approximately \$25,000,000.00 has been wasted

on these 50,000 cases. A small portion of this money spent on a constructive rehabilitation program would have avoided

this unnecessary financial loss, the bulk of which is paid for by the tax-payers of this country. The patient who is readmitted to the sanatorium again becomes a burden to the tax-payers, and many of these patients linger on for years at public expense, when they might have become useful citizens if given the opportunity for gainful employment, under a supervised rehabilitation program.

Sir Pendrill Vairier Jones foresaw this plight of the tuberculous patients of England nearly a quarter of a century ago, and in 1914, he began a rehabilitation program with one patient. Four years later, with twenty-five patients gainfully employed, Papworth Hall was purchased and the foundation was laid for the Papworth Village Settlement, which to day houses over a thousand inhabitants. The total investment does not exceed much over \$1,000,000.00 and from a report issued by Dr. Vairier Jones at the end of 1934, it was shown that \$410,000.00 worth of manufactured products were sold that year and that \$150,000.00 was paid in wages to ex-patients. The total investment for this project amounts to about one twenty-fifth of the amount of money wasted each year in this country on patients who suffer a relapse from tuberculosis. An interesting feature of the Papworth Colony is the plan of supervising the entire family, and I believe that they have given ample proof that tuberculosis is not hereditary, and that children borne at the Village of tuberculous parentage and reared under medical supervision are growing into manhood and womanhood without any visible signs of tuberculosis.

In 1913, a group of philanthropic gentlemen organized the Altio Work-



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FELIX P. MILLER, M.D., F.A.C.S., Chest Surgery



ST. JOSEPH'S SANATORIUM

1901 GRANDVIEW AVENUE

EL PASO, TEXAS

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Physician in Chief

shops in New York City for the sheltered employment of tuberculous patients who were being dismissed from the sanatoria in the Metropolitan district. The name 'Altio' taken from Altruistic was well applied to this humanitarian project. From a small beginning and after undergoing all of the hardships of the pioneer, the Altio Workshops were able to purchase their own building and equip same for the comfort and convenience of the workers. To day, the Altio Workshops employ about 130 ex-patients daily on a five day working schedule and the number of working hours for each person is prescribed by the examining physician. Hospital garments and uniforms are manufactured and the sales average approximately \$200,000.00 per year. A nurse is constantly on duty and when the ex-patients are not working, they are required to rest at the plant in steamer chairs and cots, which are provided for them. A noon day meal is prepared and served at the plant and, on rainy days, a complete change of wearing apparel is available to the workers, who commute to and from the workshop. The entire program is operated under the direction of Edward Hochhauser.

Another rehabilitation project, at Livingston, New York, operates a printing plant for the employment of ex-patients. This project has been developed by Dr. Harry Pattison and is known as the Potts Memorial Hospital. The funds to establish and maintain this institution came from a private bequest and the institution is located on the main state highway about twenty miles north of Poughkeepsie. The institution houses about 59 ex-patients who are required to establish a residence at the institution. Those patients not actively engaged in the print shop are given other remunerative employment about the grounds and in the

institution proper. Patients are, at all times, under the supervision of a resident physician and, where necessary, pneumothorax treatment is administered.

At Boston, Dr. John B. Hawes 2nd, the President of the Boston Tuberculosis Association has been instrumental in establishing a small rehabilitation project which employs between 15 and 20 men and women. The men have a carpenter shop where small furniture is built and the women operate a sewing room. A store is maintained in the business district of Boston for the sale of the products manufactured by the ex-patients and a travelling representative conducts exhibits at women's clubs and hotels throughout New England. The ex-patients commute to and from the workshop which is located in an abandoned school building in the downtown section of Boston. The number of working hours are graduated and the patients are under medical direction.

More of these projects are needed and they should be located in strategic parts of the country. In no case, can they operate at a profit, in all cases, they must be subsidized by private or public funds. The plan that takes the entire family under control is by far the most advisable, although any plan which affords remunerative graduated employment under medical direction is acceptable and should be encouraged. We should be careful not to confuse occupational therapy or vocational training with rehabilitation. The arrested case of tuberculosis presents a medical, economic and social problem and until this is effectively solved, can we truthfully say that we are fully treating tuberculosis?

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HEMOPTASIS—ITS SIGNIFICANCE AND CAUSE—(Continued from page 19)

diseases certain blood diseases and parasitic diseases. Enlarged ulcerating mediastinal glands may erode through the bronchus and give a remarkable hemoptasis. Vicarious menstruation is also a rare cause.

The treatment for hemoptasis should be absolute rest. The head should be raised slightly. An ice bag can be placed over the affected side, if known, but should be discontinued if it produces an irritative cough. The patient can tell the physician many times which side is involved when the physician cannot detect it by physical examination. The ice bag is of doubtful value, but eases the patient in that he sees that something is being done.

The use of morphine is a much mooted point. Many physiologists advise against it, but it can be used in a single dose. The amount used should be enough to allay restlessness, but not enough to abolish cough entirely. Death from massive hemorrhage is asphyxiation and slight cough will keep it moving and also prevent atelectasis distal to a blocked bronchus.

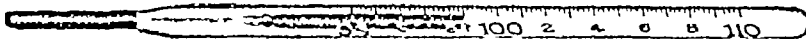
Amyl nitrite, nitroglycerine, and hemostatics are of doubtful value. Calcium gluconate has been shown to have value in certain cases.

The author has seen ovarian residue control hemoptasis in both males and females. It was noted in giving artificial pneumothorax that patients who were subject to hemoptasis bleed much more freely from the needle punctures a week or ten days prior to the menstrual cycle. Many times, hemoptasis could be predicted by this tendency to easy bleeding. The medication can be continued in females until the hormone balance is restored, in males until the tendency to bleed is controlled.

Becker advocates an intravenous solution of one percent Congo Red.

Artificial pneumothorax is the method of choice if the cause is tuberculosis and in some cases of abscess or bronchiectasis. A successful pneumothorax serves a double purpose, it will check the hemorrhage and so prevent seeding of the disease by aspirated blood in the good portion of the lung. It can also be used as a temporary measure even if it is inadvisable to be used as a permanent one. In bilateral tuberculosis, it may be difficult to determine which side is producing the bleeding, because the ordinary methods of examination are not available to us. If an x-ray is possible, the side with cavitation is the most likely locality.

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CONVALESCENCE FROM TUBERCULOSIS AND ITS DANGERS—(Continued from page 18)

press its importance on the patient's mind in my own practice I have recently prepared a weekly report blank a facsimile of which is given here. The question of dollars and cents in many cases prevents the patient from seeing his doctor as often as he should. By means of these blanks sent in to me every week, which, so far at least, my patients are invariably glad to fill out, I can keep in vastly closer touch with them than I could be before although most of them see me personally only once a month.

I feel very strongly that every sanatorium should have some person, a nurse, social worker, or some one else, whose duty it would be to sit down and talk not only once, but several times with patients who are about to leave the institution and to get in touch with their family and friends and to impress upon each patient his need of constant and prolonged supervision. Certainly, if the little village of Saranac Lake, for instance, and other similar resorts in the south and west had a person to do this among private patients, their future would be infinitely safer than it is at the present time. All this means education, not only of the public and of the general practi-

tioner, but likewise of the sanatorium physician. A well trained dentist sends out letters regularly to each of his patients stating definitely that he has an appointment to see him on such and such a day. He does not wait until tooth decay or tooth aches send the patient running to him. He is practicing real preventive medicine. The general practitioner and every one of us who is dealing with tuberculosis might well follow the example of our friends in the dental profession. No sense of false modesty or fear of being accused of "boosting up the bank account" should keep the doctor from insisting that those patients who are going through this dangerous period of convalescence of six months or a year after taking active treatment must report to him regularly. It is only by such prolonged and careful supervision of each and every patient going through this danger period of convalescence that the enormous amount of money spent every year on the upkeep and maintenance of municipal, county, state, and private sanatoria will turn out to be a paying investment and that breakdown and relapses now only too frequent will be prevented.

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THERAPEUTIC CHAOS IN BRONCHIAL ASTHMA—(Continued from page 9)

cilia as well as, to what effects their activity. In brief, the function of upper respiratory passages is to provide ventilation to warm filter and disinfect the air that passes through them, and to provide proper drainage for the various sinuses and cavities in the skull. The main defenses of the para-nasal sinuses, nose, trachea and bronchi is provided by the cilia, since the cilia never cease their activity to keep the mucous surfaces free from particles of soot or bacteria. Mucus, on the other hand, provides a suitable medium for cilia to work, to entrap bacteria by its viscosity and bring about their destruction. The importance of cilia in the bronchi is quite apparent. In the neglected allergic state which is frequently followed by a secondary infection with inflammation, the cilia are destroyed, the propulsive action is interfered with, and the only way that bacteria can be removed is by reflex action (cough). It is a known fact that allergic reactions on mucous membranes paralyze ciliary activity and interrupt normal mucus secretion, thereby weakening the resistance to bacterial invasion. Normally, bacteria are carried down the nasopharynx by cilia entrapped in the mucus and are either removed by swallowing movement into the stomach, where they are destroyed by the gastric juice, or expectorated. In some allergic states, where bacteria are not so removed, they stagnate in the nasopharynx, obstruct drainage and form what is known as nasal catarrh, which is later followed by localized focal points of infection. In short, the mucus of the normal nose and the normal activity of the cilia, are capable

of controlling pathogenic bacteria and whenever such activity is interfered with as in untreated allergic states, pathogenic bacteria obtain a foothold and the final result is a chronic bacterial invasion of the entire respiratory tract, producing a pansinusitis, bronchial asthma, bronchiectasis, and even pulmonary abscesses. This indicates that, under certain conditions neglected allergy frequently becomes a surgical problem.

While most of us strongly oppose the promiscuous slaughter of tonsils and adenoids and are against poorly advised tubineclomies and the correction of a partially deviated septum, because such operations frequently interfere with the normal function of the cilia and interrupt the normal secretion of mucus, still, when one is satisfied that foci of infection do exist, causing an obstruction of drainage, a surgical clearing of the air passages is not only indicated, but becomes imperative.

Conclusion

Opinions here expressed concerning the prevailing therapeutic chaos in bronchial asthma, are more in the form of suggestions than positive conclusions. The various forms of therapy here outlined, singly or in combination, are certainly not "a sure cure for asthma", but I have still to see a case where by using the methods here outlined, the chronic asthmatic has failed to receive either temporary or permanent relief.

3 Gastro-Intestinal Allergy L. P. Gay, JAMA, (March 21, 1936)

4 Mayo Clinic, 10 662 1935

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DIAGNOSIS OF CANCER OF THE LUNG—(Continued from page 15)

more recently, is thought by many to be a contributing factor. Other infections have been discussed. Some men feel that there is no relationship at all between tuberculosis and primary cancer of the lung. Certain it is that tuberculosis and cancer may coexist.

There are some possible chemical factors. One interesting observation is that coincident with the building of oiled roads such as we have out all through this mountain district and through the state and the nation, there has been an increase in primary cancer of the lung.

Another interesting observation is the fact that so far, primary cancer of the lung has not been encountered in the same degree in the Orient, where tarred roads are not in use, as it is here. Military gassing may possibly be a factor.

Increased longevity has been advanced as a possible reason along with other diseases which we are finding occur when people live long enough to develop them. Probably improved diagnosis is of some importance.

The diagnosis is still difficult because it is made often by bronchiectasis and pleural effusion.

J. A. Sevier, M.D. (Colorado Springs) There seems to be definite evidence that carcinoma of the lung is on the increase. This is probably a relative increase. In the first place, we are looking for it more commonly. We are taking more chest x-rays as a routine procedure, and we are getting more autopsies.

Hill of Edinburgh, in a recent account, has reviewed the subject of carcinoma up to November, 1934, and he finds that 8 per cent of all the carcinoma at autopsy is carcinoma of the lung. That seems a high figure.

As to the diagnosis, there are several facts that are fairly well established. First, we know that it occurs most commonly in the fifth and sixth decades of life. I think the common age is from fifty to fifty-five. It is much more common in males than in females—80 per cent males.

There seems to be no predilection at all as to which lung it attacks nor is there any predilection for any particular lobe of the lung.

Pleural effusion occurs in 33 per cent of the cases and is practically always a bloody effusion. It is most commonly confused with tuberculosis, lung abscess, Hodgkins' disease, aortic aneurism and pleurisy with effusion.

Clinically, there are several points of importance. First is the pain—in the chest as a rule—and this pain tends to increase rather than to abate as the disease goes on. Occasion-

ally there is prominence of the chest on that side.

If in addition there is evidence of pressure on the large vessels or pressure on the structures of the mediastinum in a patient with cough, shortness of breath and bloody expectoration from the beginning of the disease, we have a right to suspect cancer of the lung.

Also if aneurism of the aorta can be fairly well ruled out and a bloody effusion is present, I think we have a fair right to assume that we are dealing with cancer of the lung. A positive diagnosis as to the nature of the tumor can only be made by detecting tumor shreds or so-called tumor cells in the sputum or in the effusion. Removal of a portion of this tumor by the aid of a bronchoscope of course will settle the situation as to the diagnosis—or the removal of a near-by infiltrated gland. Our greatest aids in diagnosis are bronchoscopy and x-ray.

C. F. Hegner, M.D. (Denver) I am glad that Dr. Glese emphasized the importance of the chronologic history of the case of primary carcinoma of the lung. Of course the symptoms depend upon the location of that tumor in its inception. Cough is a very important thing in the bronchia, but when we have parenchyma carcinoma it is strikingly absent. The character of the sputum is of course important.

First we have an irritated, non-productive cough, there is a glairy, viscid mucus and then possibly a prune juice sputum. In the parenchymal carcinoma we do not have the dominant cough as a symptom and it is surprising to know how long these people will remain comparatively well until the beginning of the complications which so confuse the diagnosis.

The diagnosis is made most likely from history. It is corroborated or confused by the x-ray until the middle of the course and it is absolutely confused by the complications late in the course.

The phenomena of the history, then, depend upon its location and its complication. That it is on the increase I am certain. Some years ago I spent some time with Dr. Sauerbruch, whenever he received a case from a certain section in Bohemia he always made a diagnosis of carcinoma and stuck to it until he proved it otherwise. That it is on the increase, relatively as well as absolutely, in this country, I am convinced.

I saw a number of cases with the late Dr. Bronfin. I operated on some and removed pieces of tissue that were taken from cases of empyema that didn't get well, and the diagnosis was made before anything was deduced from the history.

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*"This Open Letter is Addressed to Physicians and Officials connected  
with Industrial and Welfare Organizations"*

# COMMITTEE ON ECONOMICS FEDERATION OF AMERICAN SANATORIA

*(A National Association of Private Sanatoria and Chest Specialists)*

MYRTLE AND VIRGINIA STREETS  
EL PASO, TEXAS

September 1, 1936

Gentlemen

This is the ninth in a series of open letters addressed to physicians and officials of welfare organizations. If you did not receive the previous issues, we will be pleased to furnish you with copies upon request.

The Federation of American Sanatoria believes that those patients who are able to pay for private care should be given the advantage of the individual attention, which the private sanatorium is able to offer.

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Learn about this humanitarian project by addressing the Committee on Economics of the Federation of American Sanatoria at the above address.

Sincerely yours,

COMMITTEE ON ECONOMICS,  
Federation of American Sanatoria

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Valmora  
Valmora Sanatorium

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# DISEASES

OF THE

# CHEST

Official Organ of the Federation of American Sanatoria  
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Application for entry as second-class matter is pending

(A MONTHLY PUBLICATION)

*The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind*

*Lawrason Brown, M D*

## Editorial Comment

### **This Journal**

WE, AGAIN, wish to impress upon our readers that *Diseases of the Chest* is intended to be of special interest and help to the busy family physician, who in the last analysis is the true case finder so far as the private practice of medicine is concerned. The articles published from month to month are for the most part, brief, readable, and instructive. There are other publications on the subject of tuberculosis that deal with scientific research and are most excellent publications for those who are interested in that department.

However, *Diseases of the Chest* is designed more to be of interest and help to those men who are busy in the general practice of medicine. So again, we say, this publication will continue to be a simple, readable, journal, keeping alive the principles of early diagnosis and insisting at all times that every open case of tuberculosis be segregated. C M H

### **Both Sides**

THE PAGES of this journal are open at all times to both sides of all questions pertaining to tuberculosis, its diagnosis and treatment, as well as the question of the socialization of medicine.

Editorially, *Diseases of the Chest* is against legislation which will further tend toward socialization of medicine. It is true that the speciality of

tuberculosis has become more nearly so civilized than any other branch of medicine. This has been due to the extensive drive against the disease, made by special organizations. Probably, the progress made in the reduction of the death rate and the apparent partial control has warranted this state of affairs in so far as tuberculosis is concerned. However, this drive has, in many instances, been taken out of the hands of the medical profession and command has been assumed by social economists.

We feel that throughout this great drive, the crux of the problem has been greatly neglected, viz every individual physician should have been taken into the fold of this great movement. The great medical schools of this country should have had an intensive course on the diagnosis of tuberculosis, so that each graduate in medicine would be adept in case finding. The socialization of tuberculosis is really the fault of the medical profession and before lay workers take command in some other branch, probably cancer, it is high time that the medical schools adjust their curricula—to prevent another such occurrence.

Because of these situations, *Diseases of the Chest* was founded and is published in order to carry the fight against tuberculosis into the daily practice of every physician.

C M H

# Rocky Mountain Tuberculosis Conference

THE ROCKY MOUNTAIN TUBERCULOSIS CONFERENCE will be held in Albuquerque on September 28th and 29th. This society held its first meeting two years ago at Colorado Springs. There were fully five hundred people in attendance. The enthusiasm seemed to warrant a continuation of the society, inasmuch as it seemed to fill a place in this western territory for people interested in tuberculosis.

The program will be divided into two sections, medical and sociological. They will hold independent meetings on the mornings of both days, and joint sessions in the afternoons.

There will be a complimentary dinner given by the Presbyterian Sanatorium and Hospital Monday evening, September 28th. Luncheons will be held on Monday and Tuesday noon at the Franciscan Hotel, which is the headquarters of the society. Reservation can be made directly with the Hotel, or through the local arrangements committee, of which Dr. Carl Mulky is Chairman.

Plan on being in Albuquerque September 28th and 29th L S P

## PROGRAM

Headquarters — Franciscan Hotel  
Albuquerque, New Mexico

MONDAY—SEPTEMBER 28th

### MEDICAL SECTION

Dr. Charles W. Mills, Presiding  
9 00 A M —12 00

Surgical Collapse of the Lung

R J Friel, M D

Salt Lake City, Utah

Value of Phrenic Nerve Interruption  
as the Sole Procedure in Pulmonary Tuberculosis

J M Odell, M D, Sup't

Eastern Oregon State Tuberculosis Hospital

Modified Technique in Thoracoplasty in Tuberculosis

Felix P. Miller, M D

El Paso, Texas

Some Phase of Thoracoplasty

C F Stough, M D

Colorado Springs, Colorado

When Should Artificial Pneumothorax Treatment Be Discontinued?

Munford Smith, M D

Howard W. Bosworth, M D

Barlow Sanatorium

Los Angeles, California

Anesthesia to the Tuberculous

Arthur E. Guedel, M D

Professor of Anesthesiology

University of Southern California

### SOCIOLOGICAL SECTION

10 00 A M —12 00

Finding the Case of Tuberculosis

L A Dewey, M D

Epidemiologist for New Mexico  
Bureau of Public Health

What Comes After Case Finding

From the Public Health Nurse

Ada Taylor Graham

Ex-Secretary of the Utah Tuberculosis Association

From the Case Work Agency

Clarence Jackson, Director

Public Assistance, Colorado

Department of Public Welfare,  
Denver

From the County Physician

T C McCamant, M D,

County Health Officer

El Paso, Texas

From the Cripple Children Program

Vera Jones, M D, Director, Division of Cripple Children,  
Colorado State Department of Health

### JOINT LUNCHEON

12 00—2 00 P M

Significance of Tuberculosis in Childhood

J A Myers, M D

University of Minnesota

JOINT SESSION, SOCIOLOGICAL AND  
MEDICAL

Roslyn Earp, M D, Presiding  
Director of Public Health, State  
of New Mexico

2 00 P M—5 00

Trends in the Care for the Indigent  
Sick by Public Agencies in New  
Mexico

Mr Fay Guthrie, Director of  
Security and Public Assist-  
ance

In Colorado

Robert Cleere, M D, Director,  
Department of Public Health

In Arizona

Miss Florence Warner, Director  
of Department of Public Wel-  
fare

Summary

Robert Brown, M D, President,  
New Mexico Tuberculosis As-  
sociation

Socialized Medicine as it Affects the  
Private Sanatoria

R B Homan, Jr, M D  
The Homan Sanatorium  
El Paso, Texas

TUESDAY — SEPTEMBER 29th

## MEDICAL SECTION

Dr Charles W Mills, Presiding

9 00 A M—12 00

Tuberculosis in the Aged

John W Shuman, M D  
Assoc Prof of Medicine  
College of Medical Evangelists  
Los Angeles, California

Does Tuberculin Deserve a Place in  
the Therapy of Tuberculosis?

Thirty Years in Retrospect

Max Rothschild, M D \*  
Harry C Warren, M D  
The California Sanatorium for  
the Treatment of Tuberculosis,  
Belmont, California

\*The paper entitled "Does Tuberculin Deserve a Place in the Therapy of Tuberculosis" was prepared by Dr Max Rothschild, deceased, for the Rocky Mountain Tuberculosis Conference and it will be presented by Dr Harry C Warren. (Ed. Note)

Discussion by Sam'l H Watson,  
M D, Tucson

The Virulence of Tubercle Bacilli  
H J Corper, M D  
Research Department, National  
Jewish Hospital  
Denver, Colorado

Empyema Complicating Pneumotho-  
rax Therapy in Pulmonary Tuber-  
culosis

Cap't Frank Y Leaver  
Discussion by Maj George F  
Aycock

Fitzsimons General Hospital  
Denver, Colorado

Management of Oleothorax Therapy  
in the Treatment of Pulmonary  
Tuberculosis

Leslie P Anderson, M D  
Oakhurst Sanatorium  
Elma, Washington

## SOCIOLOGICAL SECTION

10 00 A M—12 00

Educating the Public About Tuber-  
culosis

Through the Christmas Seal Sale  
Mrs Francis C Wilson, Secre-  
tary

Tuberculosis Association of New  
Mexico

Through Schools

Mrs Grace Corrigan  
State Rural School Supervisor  
of New Mexico

Through Local Organizations

Ruth Connely, Executive Secre-  
tary

Tuberculosis Association of New  
Mexico

Through Publicity

Rabbi A Lincoln Krohn, Albu-  
querque

## JOINT LUNCHEON

LeRoy S Peters, M D, Presiding  
Albuquerque, New Mexico

12 00—2 00 P M

Distribution of Tuberculosis Mortal-  
ity in Western United States  
(Continued to page 30)



## Obituary

*Max Rothschild*



It is with very sincere personal regret that we announce in these pages the passing of Dr. Max Rothschild on July 12th, 1936, at his home in Napa Soda Springs.

Dr. Rothschild was born on July 10th, 1871, at Hofgermar, Germany, and educated at the Universities of Kiel, Heidelberg, and Berlin, being graduated by the Board of Medical Examiners of the University of Berlin in 1896. After a year of post-graduate study at Berlin in Tuberculosis, he came to San Francisco, arriving in 1899, to practice medicine.

In San Francisco he met Dr. Fehleisen, the discoverer of the streptococcus of erysipelas, whom he had known in Europe and together they had many enjoyable rambles about San Francisco—as Dr. Rothschild delighted in telling.

After several years of general practice he devoted himself exclusively to the treatment of tuberculosis and pulmonary conditions. He opened the California Sanatorium at Belmont in July 1910, which has since developed into one of the largest institutions for the treatment of tuberculosis in the west.

Professionally he was always alert to new ideas, being the first clinician in

America to induce an artificial pneumothorax for pulmonary compression. He and Dr. Fehleisen obtained the first reports of Forlanini's work in Italy and constructed a pneumothorax apparatus. He was also one of the first advocates of phrenic nerve interruption and a pioneer in the use of Tuberculin. He early discovered that dosage was the important factor in treatment and, if controlled to avoid reactions, beneficial effects were obtained.

His many contributions to medical literature included monographs relative to the early diagnosis of adult and childhood tuberculosis. Being a collaborator with Hanz Much and Deyke of Germany in many of their publications, he gained international recognition. At the time of his death he was preparing a paper to be delivered at The Rocky Mountain Tuberculosis Conference in September, which detailed his experiences with Tuberculin over a period of thirty years.

His knowledge of music and the arts, combined with an incomparable personality, made him an outstanding figure in any assemblage. Over and above this, however, he will ever live in the hearts of all his friends for his generosity and innate kindness. He was an eternal optimist and had the God-given ability of making every sick individual feel cheerful and buoyant after his bedside visit. Nor was this optimism assumed as a cloak for a bedside mannerism—his optimism permeated his whole personality. As a raconteur and host he was known and loved by most physicians of the Pacific Coast, in fact who would not love and envy any one with such a philosophy and disposition.

A patient contributes—

He is not dead, and this is not the end—  
He leaves a living monument behind,  
And deep within our hearts the years will find

The ever smiling presence of a friend

H C W

# Therapeutic Chaos In Bronchial Asthma

## Introduction

THE axiom, "the less we know about a disease the more profuse its therapy," is as true today as it was in the days of Hippocrates. This is especially so with the therapy of Bronchial Asthma.

The medical profession is not wholly responsible for the many forms of therapy. Every druggist prescribes for asthma across his counter. All drug manufacturers have "something good for asthma" and every charlatan and cultist has a "sure cure for it."

In view of all this and despite the enormous amount of accumulated material and knowledge relative to the subject, there is at present a crying need to bring some order out of chaos by separating fiction from fact.

So much has already been written on this subject that one hesitates to touch it for fear of appearing presumptuous or what is still worse, of being guilty of the unpardonable sin of repetition.

Therefore, from the very first I wish to make it clear that this is not an attempt at originality. It is merely a desire to summarize etiologically, and as far as possible therapeutically, what is already known about the subject, and if it can be done, to establish some therapeutic order. I fully realize that this is quite an undertaking and if I succeed I shall feel that my efforts will not have been in vain, and if I fail in my attempt, I will have the satisfaction of knowing that I have not been the first one to fail. As some one has said, "It is upon us to begin the work, it is not upon us to complete it."

## Allergy

To achieve the proper therapeutic objectives in bronchial asthma, one has first of all to make certain that one is dealing with an allergic problem. He must also

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be sure to rule out cardiac, renal, or pulmonary pathology, as well as a possible bacterial invasion of the lungs, the bronchi, and the upper respiratory tract. In the light of our present knowledge, only true asthma is allergic and if this is so, no amount of desensitization will avail much in the presence of a chronic bacterial hyperplasia with vaso-motor disturbance that so frequently complicates many of the cases of bronchial asthma. The principle of allergy in bronchial asthma is at present so well established that only the uninitiated can question it. The fact that in numerous instances of proven allergy, desensitization with proper antigens does not seem to bring beneficial clinical results, does not necessarily preclude the fact that the allergic theory is wrong. It only proves that in a given case the real offending agents were not discovered or the proper desensitizing material used.

What actually is responsible for the somewhat ill-repute held by some for the allergic theory is, its unscientific application by those who have but a limited knowledge of the subject.

Those of us who understand these facts, have given up our limited office routine testing for allergy, not because of lack of faith in it, but because of our faith. It is because we have learned the necessity of being well equipped to handle the hundreds of substances and antigens necessary to properly carry out the tests and treatments. And, in spite of all these precautions, it frequently happens that after some patients go through the tedious and expensive allergic tests given by well-trained and well-equipped allergists, still, there is a large number of patients who do not obtain clinical relief.

In such instances, neither the allergist nor the allergic theory are to be blamed for the failure. The blame lies in the still

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limited understanding of the offending agents whose numbers are legion, because they include all foods, all pollens, dusts, bacteria, epidermals, emanations, etc. Therefore, the real wonder is not why some people are allergic, but why so few suffer from allergy and why there is not a more generalized metabolic revolt throughout the peoples of the earth, a revolt expressing itself in a more generalized manifestation of asthma, eczema, and urticaria.

That allergy is more prevalent than we believe it to be is noted by Miller, Pinness, and Feingold (1) in their most interesting recent review of hundreds of cases from the records of the allergy clinic of the Los Angeles Children's Hospital. They report eleven cases of so called allergic broncho pneumonia. All of these patients proved to be sensitive to foods, epidermals and pollens and showed a marked alleviation of symptoms when treated with specific antigen therapy. In most of these cases, the patients gave a family history positive for allergy.

The Mantoux test was negative in all cases. The Roentgen Ray films in most of the cases showed either localized or diffused infiltration of the chest, so typical of broncho pneumonia. There was also present typical asthma wheezing with sonorous and sibilant rales which were relieved by epinephrin. There was also noticed a comparatively low leucocyte count, no increase, at least not a marked increase, in the neutrophils with a comparatively high eosinophile count in the later stages of the disease. All this is certainly more typical of allergy than bacterial infection. In some of these instances, the so called broncho pneumonia was of a recurrent nature as the patients had had several similar attacks before. This, the authors claim, proves the marked prevalence of allergy which is often entirely overlooked or taken for some acute bacterial infection.

In this connection it is worth while to remember that there is such a thing as a negative phase in the presence of posi-

tive allergy. This point has been beautifully demonstrated by J. A. Myers in his communication on "Allergy, Immunity and the Genesis of the Tuberculin Reaction." He speaks of the so called anergic state, a non reactive phase of tuberculosis frequently found in individuals suffering from an overwhelming highly active infection. That there also exists an anergic phase in food, pollen, epidermal, and dust allergy is also known. Just as a negative tuberculin test does not necessarily prove immunity or absence of infection, so is it possible, at times, to have negative sensitization in the presence of positive clinical allergic manifestations. This, in view of the large number of substances to which one may be sensitive, would account for the failures in desensitization therapy in a large number of cases.

Before I speak of the therapy of bronchial asthma, I wish to make clear that there are as many therapeutic approaches to the disease as there are clinical manifestations. In this connection it is worthwhile to remember that a great deal in this approach depends upon the age of the patient, the chronicity of the disease, and whether one is attempting to give temporary relief or to work out a permanent cure. In general, it may be said that all infants and children suffering from upper respiratory manifestations such as rhinitis, polyposis, sinusitis, tonsillitis, frequent colds with cough, wheezing, sibilant and sonorous rales are allergic. These children are also frequently victims of eczema, urticaria, and gastro intestinal pains which most probably are but allergic manifestations of the same process. Such manifestations being considered as true allergy require first of all the finding of the offending agent or agents and the desensitization by proper antigens. This, as mentioned before, is a tedious and expensive process, therefore, it is suggested here that such children be first desensitized by a gradual elimination of the offending food, since in a great number of children it is food that is responsible for the asthmatic attacks.

At this point it is worthwhile to remember Gay's (2) conclusions when he speaks of gastro intestinal allergy "A food producing a symptom is also capable of partially relieving that symptom when taken later." In other words the pain of peptic ulcer may be due to a localized anaphylactic spasm which is relieved by antianaphylaxis or actually by the interval feeding of an antigenic substance which originally caused the spasm. This phenomenon, if correct, is as applicable to the broncho spasms of asthma as it is to the gastro intestinal spasm. As a general principle, it is also advisable to keep such children away from all animals, pollen- and epidermal contacts, since, as it is frequently found there is a combination of food pollen and epidermal allergy.

Since milk and milk foods and various forms of processed grains are the mainstay of infants and children's diets, it becomes necessary to eliminate such foods one at a time and observe the results until every form of food is tested. In older children the various animal proteins, eggs and fish, should be similarly studied. It is surprising how simple it is at times to find the offending food. Once the food a child is sensitive to is established that food must be eliminated from the diet. It is at times also possible to desensitize such a child by complete withdrawal of such a food and later by its oral use in medicinal doses as an antigen desensitizer. Some allergists do not believe this possible, but it is certainly worth trying.

In older children in whom untreated allergic manifestations have been of several years standing, and where there has already developed in the upper respiratory passages a bacterial chronic hyperplastic rhinitis, polyposis, or hyperplastic sinusitis with a vasomotor disturbance, no amount of antigen therapy alone will suffice. Here local surgery is frequently indicated. This goes to prove that even an allergic disease occasionally becomes a surgical problem when super-

imposed by infection, as is frequently the case in tuberculosis.

At this point, I wish to mention the debated question as to whether allergy precedes or follows surgery of the upper respiratory passages. I will return to it later and attempt to answer this question when I speak of the various forms of non allergic therapy.

### *Case Reports*

In this connection I wish to briefly mention the case of a twelve year old girl who has been allergic since infancy. At the age of six months she developed an eczema of the face and at two years began to wheeze and become dyspneic. At the age of three she was pronounced by several physicians as asthmatic. At this period she also has had a middle ear infection which probably was an allergic manifestation. Up until six months ago, she has had frequent dyspneic attacks of wheezing, sibilant and sonorous rales on the slightest exertion or change of weather or on overeating. For the last three years she has been under the care of an allergist. She has had over three hundred sensitization tests and the paradox in this case was that the food that she was supposed to have been sensitive to as proven by positive sensitization, she could at times consume with impunity. She was especially sensitive to acacia and the bermuda grass, for which she was desensitized. On examining her upper respiratory tract, it was found that she had a chronic hyperplastic rhinitis with swollen lower turbinates and a marked vasomotor disturbance. Her lower turbinates were removed. It is over six months now and she has not had a single attack. However, several weeks ago she suddenly became acutely ill with pulmonary symptoms and high temperature, 106, the high temperature lasted three days. This was pronounced a case of lobar pneumonia. Viewing this case in the light of the Miller report and taking into consideration the previous history of the patient

rent I am raising the question as to whether this could have been a case of true lobar pneumonia. Most probably it was and if so, what influence did the presence of allergy which for reasons previously mentioned was never properly desensitized, have on the infection? The hyperplasia in the upper respiratory tract was no doubt due to a chronic bacterial invasion of tissues of low resistance, caused by a preexisting allergic state resulting in rhinitis, sinusitis, and bronchitis, and finally ending in pneumonia.

These generally are the findings in neglected allergy and in cases of adult chronic bronchial asthma, frequently in a more aggravated form and with extension of the secondary infection into the lower respiratory passages, as the second case to be reported here proves.

The second case I wish to mention briefly here, is that of a female in her late thirties who is at present a veritable pathologic museum of respiratory diseases and who gives a history somewhat similar to the previous case. At the present writing, she is in the Cedars of Lebanon Hospital, suffering from a chronic hyperplastic rhinitis and pan-sinusitis with a generalized vasomotor disturbance. Her lungs show the pathologic findings, so typical of neglected respiratory allergy, which are present practically in all cases of chronic bronchial asthma, of course, with some variations. This patient's Roentgenogram shows areas of chronic pulmonary fibrosis, peribronchial thickening, bronchiectasis, patches of emphysema, and some areas that may be interpreted as atelectatic. This is a typical case of grossly neglected allergy, inevitably resulting in a superimposed secondary bacterial invasion of practically all the upper and lower respiratory passages with various foci of infection. While in the hospital, and later as an out patient, she had a number of bronchoscopies, a Caldwell Luc operation, as well as an endonasal ethmoid and sphenoid operation.

I wish to report another case, which is typical of many chronic asthmatics,

and I also wish to call your attention to the dangers of self-medication and the use of untried and scientifically unproved therapeutic agents, also to call attention to the dangers of the Benzol group of drugs—drugs at present much in vogue and no doubt responsible for the present increased incidence of acute yellow atrophy of the liver. These are Phenylethynic acid, cencophan, quinophan, atophan, agofan, and phenoquin.

### *History*

Patient—42 years of age Married

While a patient at the Cedars of Lebanon Hospital five months previous, she had been diagnosed a case of bronchial asthma. She had had the usual allergic tests, however, she had never completed them. She had undergone several operations for nasal polyps and drainage of the sinuses. In spite of all this, her attacks continued and became progressively worse. She took innumerable patent medicines. Finally she bought an electrically driven atomizer distributed by a New York concern, using the German drug preparations called Glycerenan, Apholgol, and Jodirenal. Following this medication the asthmatic attacks ceased. The cure was "miraculous", this, according to the statement of both patient and family. The patient used this cure for about one month. Three weeks previous to second admission to this hospital, patient noticed that she was becoming jaundiced, she began to feel weak and drowsy and was admitted because of these symptoms.

### *Examination*

A middle aged female, stuporous to comatose, skin intensely jaundiced. Eyes Sclera deeply injected—pupils reacted to light and accommodation, fundi negative. Ears, nose and throat negative. Chest no evidence of lung pathology. Heart slightly enlarged to the left, tones of good quality, rate 120, no evidence of valvular

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# Pulmonary Tuberculosis Surgery and the Sanatorium

IN THE last decade, surgery has come to play a prominent role in the treatment of pulmonary tuberculosis.

Many are the surgical procedures employed, the more common being thoracoplasty, phrenicectomy, intrapleural pneumolysis, plombage, scalenotomy and intercostal neurectomy. The principle underlying all of these measures is one of pulmonary rest and compression.

The field of thoracic surgery is in its comparative infancy. Few surgeons are adequately trained in this branch of surgery. As a specialty it is slowly emerging from the realm of general surgery. Eventually, it may be split off from general surgery just as, in the past few years, brain, genitourinary, and orthopedic surgery have been.

With this background in mind, namely, the relative newness of chest surgery and the few men trained thoroughly in its intricacies, we can easily understand the predicament in which sanatoria found themselves when tuberculosis surgery suddenly dawned upon the therapeutic horizon. The only solution to the problem of pulmonary tuberculosis surgery seemed to be to send those cases suitable for surgery to various general hospitals which boasted a general surgeon with some interest in chest surgery. As a few years passed, these same surgeons became more grounded and adept in thoracic surgery, so that at the present time the indications for surgical intervention in pulmonary tuberculosis and the operative technique, in the main, are capably understood. Of late, these surgeons have taken younger men under their tutelage and trained them adequately in chest surgery.

This is, then, the status of surgery in pulmonary tuberculosis at the present time, that is, the majority of sanatoria send their patients to general hospitals to be operated on, usually by general

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surgeons with a leaning towards chest surgery. Only in a rare instance does the general hospital have a surgeon doing chest surgery solely. A few of the sanatoria are equipped with operating units and a surgeon is called in to perform the necessary operations. It is a rare sanatorium which has, in addition to its own operating unit, its own resident thoracic surgeon. This apparent lack of competent chest surgeons can be attributed to the newness of chest surgery, the sudden rise of operative intervention in the treatment of pulmonary tuberculosis, and the few men specially trained in chest surgery.

The present arrangement and state of affairs appears to be a temporary one, and the entire matter is in a state of flux. Is there any real necessity for a change? If so, why, and in which probable direction will the change take place?

There are many reasons why the present set-up is inadequate as regards the best interests of the patient and the sanatorium. First, there is a lack of personal contact between the patient and the chest surgeon. We must consider the mental and emotional background of the tuberculous patient. They are being sent from the home-like atmosphere of the sanatorium, where they may have been a period of years, to a new and somewhat indifferent general hospital. All of their friends among the doctors and patients at the sanatorium have, in one fell swoop, been swept away and they must again build new attachments. This in itself would be difficult for any type of patient, but it is specially taxing for tuberculous patients. In the sanatorium their affliction is taken for granted and requires no comment, but in the general hospital, due to the lack of understanding and sometimes to the hostility of the other patients, theirs is the stigma of tuberculosis.

Usually, the chest surgeon in a general hospital accepts a patient from a sanatorium as being suitable for surgery merely by reviewing the x-ray films plus the comment of the sanatorium physician. He does not see the patient in his various moods, degrees of depression and periods of remission and exacerbation. It is entirely possible that if the surgeon had the opportunity to study and watch the patient for longer periods he might be guided not only in his operative technique, but in the proper time to operate. It is conceivable that with this added factor of more personal contact between the patient and the surgeon, a lowering of the mortality and morbidity rate in pulmonary tuberculosis surgery would be possible.

Secondly, the general hospital is usually at a distance from the sanatorium. This means that the patient must travel by train, or possibly by ambulance, for many miles. This trip must, and does, tax the strength of the tuberculous patient. On more than one occasion, a patient with pulmonary tuberculosis admitted to a general hospital after a long trip from the sanatorium is so exhausted that days and sometimes weeks of bed rest are necessary before the patient once again shows a semblance of his former reserve and resistance. It might be argued that those who react so poorly to an extensive journey are not fit subjects for surgery, but it has happened that a patient who by reason of his x-ray film and general condition, seems to be ideal for operative intervention, has been weakened by the stress of added effort and fatigue.

Thirdly, the matter of expense must be considered. The length of stay in a general hospital for surgical treatment is variable, but every day must be paid for by someone. Either the county, city, state, or private organization foots the bill. Minor charges incidental to operation must also be taken into account. Although it is expensive to equip a sanatorium with a suitable operating unit, yet in the long run it will be cheaper for

the sanatorium, since the cost of maintaining the patient in a general hospital will be obviated. It is true that there is a definite minimum rate which is necessary to support a patient in a sanatorium, but the expense is less than that of keeping the same patient in a general hospital.

Again, if one reverts back to the preceding paragraphs concerning the expense of transportation of patients from the sanatorium to the general hospital, this item will also be eliminated, it is a considerable one, especially in those instances where the patient is moved from the general hospital to the sanatorium between the various operations, as for example between stages of thoracoplasty.

Fourthly, there is bound to be an inadequate follow up of the cases operated upon under the present system. No matter how interested the surgeon is in his cases or how faithfully he may intend to follow them, the fact remains that other duties are close at hand and the sanatorium is miles away. The physical and emotional changes after operation have been done, the late reactions and the exact knowledge of what happens to these patients months and years after operation are sometimes weakly understood.

At best, the follow-up of operated patients under the present system could not be compared with an arrangement whereby the surgeon would have closer, more frequent and almost personal contact with the patient from the day he enters the sanatorium to the day of discharge. Even after the patient has left the sanatorium, a more complete check up can be made by men who are constantly examining the patient than by surgeons in general hospitals who have so many other interests and duties to take up their time.

Only by a sufficient follow up can the exact indications for and the results of operative procedures in pulmonary tuberculosis be evaluated. It is not enough to send patients back to the sanatorium, who have merely survived the operation. One must know what happened to the patient

six months, one year, and five years after operation. Only by enlarging our knowledge on this score can we truthfully promise our tuberculous patients a cure.

Thus, it seems that there is a need for a change in the present set up of the surgical management of pulmonary tuberculosis. First, because of lack of personal contact between the patient and the surgeon, second, because of the deleterious effects of transportation upon the patient, third, the economic factor of stay at a general hospital, and fourth, the inadequate follow up of patients by the surgeon.

Assuming that a change in the present arrangement of handling pulmonary tuberculosis surgery is necessary, let us try to prophesy the manner in which it will come about.

First, every sanatorium of sufficient size, and most are large enough, will have its own operating unit. Although the expense of setting up such a surgical wing must be considered, yet, as brought out in the preceding paragraphs, it will be less expensive, in the long run, than transporting patients to and from the general hospital and maintaining the patients at the general hospital during the period necessary for surgical treatment. This is the first prophesy.

The second prophesy follows the first one logically, in that if the sanatoria are to have operating units they must be manned by surgeons who will come out to the sanatoria to do their operating. Regarding this phase of change in the present system there are three possibilities.

The first possibility is that the general surgeon interested in chest surgery, who is doing the pulmonary tuberculosis surgery in his own hospital, will see fit to travel out to the sanatorium to operate. This seems very unlikely, and almost without the realm of possibility, because the good general surgeon who is usually entrusted with these chest operations is so busy with his other surgical problems that he will not have the time to make these frequent trips to the sanatorium.

Therefore, pulmonary tuberculosis surgery will pass into the hands of men in the category listed in the succeeding paragraphs.

The second possibility is that surgeons specially trained in chest surgery, and probably devoting themselves entirely to chest surgery as a limited specialty, will be appointed by each state or group of states, depending upon the bed capacity and number of sanatoria in a state, to visit the sanatoria under their jurisdiction and perform the necessary chest operations. This arrangement will be a much better one than the system in vogue at present. These men will be interested, mainly, in chest surgery and so bring all their creative efforts into a complete and sounder basis for the performing of chest operations.

Again, these surgeons will be almost in constant touch with their sanatoria so that there will be more of the personal contact between patient and surgeon, and a better follow up on the operated patients. This seems to be the next step in the evolution of the management of pulmonary tuberculosis surgery.

The third possibility, and the final refinement, will come when every sanatorium will have its own resident chest surgeon. At present, this is not possible because of the relative youth of chest surgery, and the fact that sufficient time has not elapsed thus far to adequately train a large enough number of men in this branch of surgery to satisfy the demand of all sanatoria.

When the time comes, and it will be soon, each sanatorium will have its own operating wing under the supervision of a resident thoracic surgeon who has been trained thoroughly in his chosen field. Then, and only then, will the ideal personal contact between patient and surgeon be established, and also a complete and searching understanding of what happens to the operated patients from the time of admission to the sanatorium.

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# The Tuberculin Test

THE TUBERCULIN test is a simple and effective method by which a person infected with tubercle bacilli can be distin-

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guished from a person who has not been so infected. The present day emphasis on early diagnosis makes this test extremely valuable since it detects the presence of tuberculosis long before other means of examination have any value. "The time has arrived," says Myers, "when tuberculin testing should be as much a part of every medical examination, regardless of the age of the patient, as the Wassermann or urinalysis tests are."

In essence, the tuberculin test is a practical application of the complex tissue phenomenon known as allergy. Although the exact nature of allergy is still unknown, many of its actions are easily recognized. For example, it has been found that living tissue becomes sensitized or hypersensitive to foreign proteins, proteins differing from those of its own composition, causing a marked reaction to occur whenever the same protein is introduced a second time. Thus the tissues of a person infected with tubercle bacilli will show a definite and specific reaction when injected with the products of tubercle bacilli. Contrary-wise, a person who has never been infected with tubercle bacilli will show no reaction when injected with the same material.

The tuberculin test is simply a visible application of the above mentioned tissue reaction. When tuberculin, a substance composed of the products of tubercle bacilli, is injected into the skin of a tuberculous person the area of injection becomes red, swollen, and slightly brownish by the end of forty eight hours. A non-tuberculous person, on the other hand, will show no reaction when injected with tuberculin. The tuberculin reaction is, therefore, definite, specific, and accurate. Definite because an area of redness with swelling and a brownish discoloration is

easily differentiated from the normal contour and color of the skin. Specific because without a preceding infection with tubercle bacilli no reaction will occur. Accurate because no other known combination of factors will give the same result. That is, a person cannot become sensitive to tuberculin by any means except a previous infection with tubercle bacilli.

Since 1890 when Robert Koch first discovered tuberculin and noted its action, many methods of performing the tuberculin test have been tried. The most accurate, and therefore the most preferable, is the intracutaneous test proposed by Mantoux in 1907. By this method a small measured amount of tuberculin of known concentration is injected into the skin of the forearm producing a small wheal at the point of injection. The test is most frequently performed by injecting 0.1 cc of a solution consisting of one part Old Tuberculin in 999 parts of normal salt solution. This dose contains 0.1 milligram of tuberculin and is a satisfactory amount for general purposes in the testing of children. Adults, on the other hand, usually react to a much smaller amount of tuberculin and should always be tested with a dose of 0.01 mg to avoid excessive and unpleasant reactions. In order to obtain accurate information, all negative reactors must be retested with larger amounts of tuberculin. For children, the dosage is increased from 0.1 mg to 1 mg, while with adults it is increased from 0.01 mg to 0.1 mg and then to 1 mg. When time is not an important factor it is usually advisable to make the first test with 0.01 mg of tuberculin, even in the testing of children. In 1934 Long, Seibert, and Dorset perfected the material known as Purified Protein Derivative. This substance will, no doubt, soon displace Old Tuberculin as the standard material for making tuberculin tests. On the basis of three thousand

tests comparing the Purified Protein Derivative with Old Tuberculin, Long, Aronson, and Seibert concluded that PPD is superior in potency, uniformity, and general reliability.

Interpretation of the tuberculin test should normally be made at the end of 18 hours, at which time the reaction usually reaches its maximum. At this time a positive reaction produces a definite area of oedema surrounded by an area of hyperemia. A negative reaction shows nothing at all, or at most a small area of redness without oedema. According to the National Tuberculosis Association classification, a positive reaction has been arbitrarily designated as one, two, three or four plus, depending upon the extent of oedema present. A reaction with definite oedema from five to ten millimeters in diameter, is recorded as a one plus reaction, with an area of oedema measuring ten to fifteen millimeters, it is called two plus, while one exceeding twenty millimeters is known as a three plus reaction. A four plus reaction consists of even more redness and oedema than the three plus, together with an area of necrosis. When the area of oedema measures less than five millimeters the reaction is called doubtful. Investigations so far have failed to show much significance as far as the extent of the reaction is concerned, consequently, many workers now record the test as simply positive or negative. The discoverers of PPD believe that with their standardized product the degree of reaction may assume significance.

A negative tuberculin test indicates that (1) the person tested has never been infected with tubercle bacilli or that, (2) a previous tuberculous lesion has completely healed and so has become obsolete. In the words of Eugene L. Opie, "A negative tuberculin reaction is evidence that there is no existing tuberculous infection." There are, of course, a few easily recognized exceptions to this rule. It is well known, for example, that the sensitiveness to tuberculin may be decreased or even disappear during the course of

exanthematous diseases or during the course of other diseases associated with high temperature. Likewise, the tuberculin test is negative immediately following infection with tubercle bacilli (during the preallergic stage) because it requires a period of from two to three weeks for the tissues to become sensitized.

A positive reaction has great significance both for the person tested and for the community at large. To the person reacting, it means that he has at some previous time been in contact with someone having active tuberculosis and that he now has at least one focus of living tubercle bacilli in his body. This, of course, indicates that a positive reactor has acquired the primary or first infection type of tuberculosis, and may signify that he has the secondary or reinfection type of disease. Unfortunately, however, the tuberculin reaction does not give information regarding the age, size or type of the tuberculous lesion. An arrested primary lesion too small to be demonstrated even by x-ray, a moderate sized well encapsulated lesion, or a large progressing lesion may produce the same degree of reaction. In short, the tuberculin test does not differentiate between active and latent tuberculosis. All positive reactors should, therefore, be examined thoroughly to determine the kind of lesion present.

Although most positive reactors will be found to have an inactive or arrested primary lesion, Myers maintains that they have a definite health liability. This liability results from two factors. First, there is the ever present danger of reactivation of the primary lesion from overwork, worry, or general unhealthful living. Such a reactivation will, of course, result in active tuberculosis of the secondary type, the kind of tuberculosis which causes disability and death. Second, the tissues of a positive reactor are allergic to tuberculin thus making the comparatively harmless products of tubercle bacilli virulent poisons. At the same time any exogenous infection with tubercle bacilli will of necessity result in a second

dary, and therefore dangerous type of tuberculosis. From extensive studies at the Lymanhurst School Myers found that a child with a positive tuberculin reaction was five times as likely to develop active tuberculosis as was a child with a negative reaction. These findings have revolutionized child health procedures since they have clearly demonstrated the necessity of watching all positive reactors very carefully for any symptoms of active disease. This line of action is exactly opposite to the one formerly employed when positive reactors were assumed to have acquired a more than normal resistance to tuberculosis.

The community benefit to be derived from use of the tuberculin test increases with the number of tests performed. When all individuals of a community are tested it is easy to spot sources of infection since the number of positive reactors will increase markedly around each source. Widespread tests also definitely localize the areas in which tuberculosis control should be most stressed. Such a series of tests reveals frequently the presence of unsuspected spreaders of tubercle bacilli and thus allow the community to take precautions against further contamination. Formerly the source of infection was frequently traced to a dairy, but present day checking of dairy cattle by means of the tuberculin test has practically eliminated this source.

World wide use of the tuberculin test has greatly increased present knowledge concerning the prevalence of tuberculous infection. Formerly, it was believed that all adults and 95 per cent of the children of teen age were infected with tuberculosis. Now it is known that these figures were much too high, the correct figures, in the United States at least, are around 50 per cent for adults and 10 per cent for children of teen age. The decrease in the number of positive reactors is taking place quite rapidly in many parts of the United States as shown by tests made upon various classes of the population. For example at the Lymanhurst school

where repeated tests have been made there has been a drop of 43 per cent during the last fifteen years. Studies made upon university students have shown that the amount of infection varies markedly in different parts of the country. The highest incidence of positive reactors occurred at Yale University which showed 62 per cent, while the lowest was at Lewiston State Normal College, Idaho where only 15 per cent were positive.

#### *Summary*

1 The tuberculin test is a simple and accurate method of determining the incidence of tuberculous infection.

2 The Mantoux or intracutaneous method is the preferable way of performing this test.

3 Interpretation of the reaction should take place 48 hours after the test is performed.

4 The degree of reaction has little significance, therefore, the result should usually be designated as simply positive or negative.

5 A negative test is one which produces no reaction, or at most merely a small area of redness without oedema.

6 A positive test is one which produces a definite reaction with hyperemia surrounding an area of oedema at least 5 mm in diameter.

7 Aside from a few easily recognized exceptions, a negative tuberculin test is evidence that there is no existing tuberculous infection.

8 A positive tuberculin test is evidence that at least the first infection type of tuberculosis is present.

9 A positive tuberculin reaction denotes a distinct health liability because of danger from

- (a) Reactivation of the present lesion
- (b) Active tuberculosis from subsequent exogenous infection
- (c) Harmful allergic reactions from any tuberculo protein

10 Large scale tuberculin tests frequently disclose unsuspected sources of infection.

(Continued to page 24)

# The Influence of Pneumothorax Treatment On the Prognosis of Tuberculosis<sup>\*</sup>

SINCE the days of Hippocrates, rest, fresh air, and diet have been the fundamental measures employed by the medical profession in the treatment of pulmonary tuberculosis, but not until the middle of the nineteenth century was a scientific and systematic attempt made to carry out these agencies. In 1859 Dr. Brehmer, 1 a German physician, first introduced the idea of sanatorium treatment. Since that time, no greater advance has been made which offered more hope to the sufferer from tuberculosis than the advent of artificial or induced pneumothorax therapy. James Carson 2 of Liverpool in 1821 was probably among the first to recommend its use on theoretical grounds. In a series of essays on the physiology of the lungs he pointed out the advantages to be derived from this procedure. During the next fifty years practically nothing appeared in the literature pertaining to this subject. In 1880 Toussaint 3 and notably Forlanini 4 in 1882 advocated its introduction. Potain 5 in 1884 actually treated a case of spontaneous hydro pneumothorax by replacing the fluid with sterilized air on repeated occasions. He treated two other cases in a similar manner and reported them in 1886. In 1885 Cayley 6 treated a case of severe hemoptysis in phthisis by open incision of the chest wall with gratifying results. In 1888 Forlanini 7 began to treat some cases and made reports of them in 1894 and 1895. J. B. Murphy 8 of Chicago in 1898 advocated its use and treated five patients, employing in his operation a trocar and cannula. In 1904 Saugman 9 introduced the water manometer. Finally, in 1906 Forlanini 10 reporting the favorable results of his experience with this method, published his

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paper, which at that time was not given by the medical profession the full recognition to which it was entitled.

It was not until a decade later, or during the last eighteen years, that this procedure, which offers to the patient the greatest hope of recovery, became fully recognized as a great step forward in the treatment of this disease. This belated recognition was probably due to two factors: (1) the failure at that time on the part of the general profession to diagnose tuberculosis in the early stages, (2) the lack of the universal use of the roentgen ray.

Today these factors do not hold true because of the widespread dissemination of our knowledge of tuberculosis, both to the laity and to the medical profession. The diagnosis of this malady is made much earlier and more frequently than formerly. Then too, the development and almost universal employment of the roentgen ray by the profession and the hospitals has materially aided in the diagnosis and has become a necessary and valuable adjunct in pneumothorax therapy. The fact that nowadays no physician would consider a diagnosis of pulmonary tuberculosis complete without the use of roentgen ray films as an integral part of a complete history gives the diagnostician a better understanding of the pathology present, and enables him to visualize more clearly the type of treatment which may in a given case be productive of the most satisfactory results.

If, then, we wish to evaluate the influence of pneumothorax treatment on prognosis in pulmonary tuberculosis, we must of necessity consider the conditions in which this therapy is applicable. If cases are not well selected, the results obtained will not be a true criterion of its value as a therapeutic measure. For this

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reason we will enumerate the conditions in which artificial pneumothorax has a justifiable application, based on the consensus of opinion of a vast majority of workers in this field as shown in a review of the literature and in our own experience during the last five years

(A) In all unilateral cases, if (1) there are constant rales to be heard over an area corresponding to two ribs or intercostal spaces or more with positive sputum and roentgen ray findings, (2) the disease is acute, (3) in spite of rest in bed, the activity persists or improvement is not satisfactory, (4) the patient for any reason is unable to undergo prolonged hospitalization, (5) there is repeated or severe hemoptysis or hemorrhage, (6) there are cavities with copious sputum, (7) certain complications, such as tuberculous laryngitis, should be present, (8) there is massive atelectasis or massive fibrosis

(B) In bilateral cases the same indications are employed, influenced somewhat by the condition in the contralateral lung

In reviewing the literature of the last fifteen years we find numerous reports based on statistical evidence of the beneficial effects of pneumothorax Saugman and Brauer 11 report that out of 310 far advanced cases during the first year 74 or 33.9 per cent were fit for work, after the first year's treatment 42 per cent, and from the fifth to tenth year 30 per cent This covers the period of 1907 to 1918 Moreover, Saugman stated that he did not know of any other treatment that gave third stage sputum positive cases 33 per cent chance of being able to work after seven years Dumarest 12 states that in 209 cases up until 1923 he obtained favorable results in 129 or 56.3 per cent, and unfavorable in 100 cases, or 43.7 per cent Bonzoni 13 has collected statistics from

3680 cases treated from 1916 to 1925, including 71 cases under his own observation Of this total 25 per cent were described as cured, 27.1 per cent as improved and 31.2 per cent as dead Noveau 14 collecting results from 570 cases of fibrocasseous tuberculosis from Rist's clinic found 31 per cent clinically cured, 17.5 per cent improved, 17.5 per cent stationary and 34 per cent unimproved and dead The Matsons 15 among 423 cases of fibrocasseous and fibrocasseous cavernous cases obtained results which are closely similar, namely, 32 per cent clinically cured, 20 per cent arrested, 16 per cent unimproved, and 32 per cent dead Again the Matsons

Table 1 Diagnosis in 185 Cases at Time of Beginning of Pneumothorax Treatment

|                                |      |                       |
|--------------------------------|------|-----------------------|
| Minimal type                   | none |                       |
| Moderately advanced bilateral  | 14   |                       |
| Moderately advanced unilateral | 31   | (total 45 or 24.32%)  |
| Far advanced bilateral         | 87   |                       |
| Far advanced unilateral        | 41   | (total 128 or 69.20%) |
| Tuberculous pneumonia          | 8    | (or 4.32%)            |
| Atelectasis                    | 4    | (or 2.16%)            |

Table 2 Incidence as to Sex

|                |                 |                |
|----------------|-----------------|----------------|
| Males          |                 | 51 or 27.57%   |
| Females        |                 | 134 or 72.43%  |
| Up to 20 years | 20 to 30 years  | 30 to 40 years |
| 35 or 18.92%   | 85 or 45.95%    | 41 or 22.17%   |
| 40 to 50 years | 50 years and up |                |
| 21 or 11.35%   | 3 or 1.61%      |                |

Table 3 Indications for Pneumothorax Treatment in 185 Patients

|                                   |    |                       |    |
|-----------------------------------|----|-----------------------|----|
| Cavitation                        | 61 | Unilateral unilateral |    |
| Stationary                        | 49 | cases                 | 10 |
| Hemorrhage                        | 35 | Atelectasis           | 4  |
| To continue Treatment             | 10 | Spontaneous pneumo-   |    |
| Severe toxemia (or acute illness) | 21 | thorax                | 2  |
|                                   |    | Diagnostic            | 1  |
|                                   |    | Relief for pleurisy   | 1  |

Most Frequent Complications Present at Time of Treatment

|                        |    |                 |   |
|------------------------|----|-----------------|---|
| Tuberculous enteritis  | 24 | thorax          | 2 |
| Tuberculous laryngitis | 14 | Syphilis        | 6 |
| Spontaneous pneumo-    |    | Hyperthyroidism | 4 |

Table 4 End Results Obtained

|                          |              |              |
|--------------------------|--------------|--------------|
| Arrested and working     | 73 or 39.46% | (total 88 or |
| Arrested and not working | 15 or 8.10%  | 47.57%)      |
| Improved                 | 35 or 18.92% | (or 123 or   |
| Unimproved               | 8 or 4.33%   | 66.49%)      |
| Dead                     | 54 or 29.19% |              |

Table 5 Types of Pneumothorax Established and Results Obtained

|                               | Number of Cases | Improved and Arrested Cases | Unimproved                  | Dead       | Sputum Negative | Positive  |
|-------------------------------|-----------------|-----------------------------|-----------------------------|------------|-----------------|-----------|
| Selective                     | 46              | 46 or 100%                  | 0                           | 0          | 31 or 67%       | 15 or 33% |
| Complete                      | 39              | 30 or 77%                   | 1 or 2%                     | 8 or 22.8% | 21 or 54%       | 18 or 46% |
| Incomplete                    | 100             | 47 or 47%                   | 7 or 7%                     | 46 or 46%  | 46 or 46%       | 54 or 54% |
| Average hospital stay         |                 | 12.3 months                 | Minimum period of treatment |            |                 | 1 month   |
| Average duration of treatment |                 | 9.4 months                  | Maximum period of treatment |            |                 | 40 months |

and Bisaillon 16 stated that the most favorable cases, fibrocaceous disease without cavitation, resulted in some 40 per cent becoming clinically well and 16 per cent arrested, while similar figures for caseous pneumonic tubercle dropped to 23 per cent and 3 per cent respectively. Maendl 17 also found that in a follow up of 172 of his own cases a lasting result was obtained in 49 per cent. Hodson and Johnson of London 18 report in 1932 a series of 55 cases of which 34 remained free of symptoms and were either in actual employment or fit to work.

Finally in the September, 1932 issue of the *Tubercle*, G. Hurrell 19 reported a series of 149 cases from 1923 to 1928, out of which 102 cases were successful 75 per cent of the cases being between the ages of 15 and 20 years. All patients had tubercle bacilli in the sputum and very few were early cases. Of the successful pneumothorax patients, 29.4 per cent are still alive and of the unsuccessful only 10.6 per cent.

Our own experience with this treatment at the Mt. St. Rose Hospital over a period of five years from 1929 to 1933 inclusive, is strikingly similar to the statistics above quoted as to the favorable results obtained. Out of a total of 1156 admissions during this five year period 185 received artificial pneumothorax, a percentage of 16.1 per cent. This low average can be attributed to the fact that practically 96 per cent of our patients are in the second and third stages of the disease when admitted to the hospital. The diagnosis of these 185 cases at time of beginning of treatment is shown in table 1.

#### *Comment*

From an analysis of the foregoing tables, what inferences or deductions are we logically entitled to make? Today it is universally conceded that the earlier a patient is given the benefit of pneumothorax therapy the more satisfactory are the end results. Most observers state that the maximum benefits are obtained

in the early cases, in our series we have no patients under that classification. Our most favorable ones were the unilobar and unilateral cases with cavitation. These amounted to only ten. All the others were moderately or far advanced. Despite this fact we were able to obtain in our series of 185, 73 or 39 per cent who became completely arrested, with negative sputum. These were able to resume some form of work. Another 15 or 8.1 per cent were arrested but are at present not working. This makes a total of 88 arrested cases who would otherwise never have recovered, representing a percentage of 47.57 per cent. The fact that 8 or 4.33 per cent remained unimproved and 51 or 29.19 per cent died is no reflection on this form of treatment. It merely implies that pneumothorax therapy was given too late in the course of the disease to be of benefit. It imparts to us the lesson that it is advisable to make our diagnosis earlier and to apply this remedy at the time when the disease process has not advanced too far. Even in cases where the end results are not completely satisfactory this method is a life saving measure, especially when there are recurrent hemorrhages or when in spite of bedrest the patient continues to run an acute progressive toxic course.

#### *Conclusions*

The best results are obtained in the unilateral group when there are no adhesions to interfere, and in bilateral cases with less than a third of the contralateral lung involved. The immediate effects are compression and rest of the diseased lung. Resulting from this we have in many instances closure of cavities, stimulation of fibrosis and reduction in the amount of the area involved. This treatment also has a marked effect on the temperature and sputum, 98 or 53 per cent of our cases were converted from positive to negative sputum and 123 or 66 per cent became afebrile. The ef

(Continued to page 26)

# The Psychology of the Tuberculous<sup>4</sup>

HAVING lured the erudite to start reading this let the title be hastily changed into "The State of Mind of the Tubercu-

lous," lest one be accused of pretending to a knowledge which one does not possess

Is there an attitude of mind characteristic of the tuberculous? Does the toxin produce anything comparable to the relentless deression of influenza the abject apathy of ankylostomiasis or the cunning mendacity of opium?

Surely it would be absurd to suppose that a disease that can so modify the rest of the body as to give rise to the tubercular facies would not at the same time modify the mental processes. And do we not find that those young patients, many of them cases of glandular or bony tuberculosis who look so ethereal with their limpid eyes and long eyelashes and high colour, do tend to have mental characteristics of their own? They are gentle and kindly, enthusiastic and excitable, imaginative and amenable, and as a rule content, in fact like characters from a Sunday school story, whom unfortunately they too often imitate by dying young

In pulmonary tuberculosis where the action of the toxin is intermittent the mental state varies, corresponding with the periodic activity of the disease. When the toxin is in large doses it produces a vivid effect

J B—Young man who had seen some service in France was sent home with acute exudative disease. In the sanatorium the temperature rose to 102° every night for six weeks. Said he rather looked forward to the afternoon when his temperature began to rise, as then in imagination he sallied out into a phantom "No Man's Land" and aimed with a knife or club wallowed in blood and excitement. This went on for hours night after night until

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he fell asleep. Later there was a sad reaction, when waking in a night-sweat, all his fiery imagining gone he faced a depres-

sing reality

R H—Sailor with advanced bilateral disease being brought back from Australia. Ran a temperature 102° to 103° every night. Asked what he thought about then, he said he was imagining he was helping in perilous rescues at sea. He added a significant sentence: "But it never seems to work out quite right."

Anyone who has ever had a tuberculous temperature will recognize that "Treasure Island" faithfully reproduces the tempo of his thoughts. Perhaps that explains the wonderful patience of the tuberculous, there are consolations in vivid imagery

Fishberg gives a long list of authors and poets in whom the tuberculous toxin, we may suppose, has supplied some at any rate of the stimulus to their mental processes

Here are two cases in whom the stopping of the supply of toxin by the arresting of the disease was coincident with the end of their literary efforts

F G—Had an active apical lesion and while in this state wrote verse. Had a very "good press" and was hailed as one of the coming Georgian poets. Met by chance ten years afterwards when the tuberculosis—and the verse—were almost forgotten. His wife said "F never writes now. Such a pity!" Was somewhat mollified when told he probably never would unless his lung broke down again

D C—Had disease of both lungs. While in bed and under sanocrysin started writing to the papers and getting stories accepted. Envisaged a time when he could retire to a country cottage and make his living by writing. As his condition improved "rejection slips" became more frequent and finally monotonously

<sup>4</sup>Reprinted from British Journal of Tuberculosis July 1936



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Probably the best thing for a tuberculous writer or artist is that he should be a 'leaker—one in whom small quantities of toxin are liberated from time to time but never in sufficient amounts to do great harm

There seems to me to be one characteristic of the tuberculous at all times even in their good phases their normal attributes especially perhaps their expansive ones, are accentuated, the adventurous become more adventurous the cheery more cheery the generous more generous Just as in G.P.I. the megalomaniacs are those patients who were always that way inclined in their normal days, the melancholics are those who were always of rather a depressed nature, while the ordinary natures in whom the cosmic rhythm brought grave and gay phases are alternately megalomaniacs and melancholics, so in tubercle the natural characteristics are enhanced

There is one very marked type of tuberculous mentality which is not nearly so common in these days of controlled temperature as it used to be the fervid, fiery, febrile type, the extrovert with a mission and the tuberculous toxin as a compelling force within him Many cases be culled from history, the records of social reform, and criminology Probably the two last-mentioned characteristics are due to the same cause, the lowering or poisoning of the more recently acquired inhibitory mechanism or restraint Another vaso dilator poison, alcohol, does the same, and it has this too in common with the tubercular toxin it renders its victim contentment

Much has been written about the increased sexuality of the tuberculous, the old puritanical school who thought that

tuberculosis was the Nemesis of sexual excess being superseded by the kinder French school who recognised that the excess was the result of the unnatural stimulus of the toxin This too seems to be much rarer nowadays—or at any rate it does not obtrude itself—but when it does occur it seems to have one characteristic, which is just what one would expect from a poisonous stimulus satisfaction is never reached and desire doth outstrip performance The three cases who have been brought to my notice were all ambulant, febrile and did not know they had the disease

There are some who regard a certain cantankerousness, a desire to hurt, a waspishness, as part of the abnormal state of the tuberculous But surely that is acquired through a normal psychological process A young man with his career shattered, the brand of Naaman imagined caged and confined, or a married man, the clouds of financial chaos approaching him, is merely reacting normally to hard circumstances Prisoners of war apparently did the same, the crews of ships on long voyages certainly do—and without the same excuse

#### THE TUBERCULIN TEST—(Continued from page 18)

11 World wide use of the tuberculin test has shown the incidence of tuberculous infection to be much less than was formerly believed

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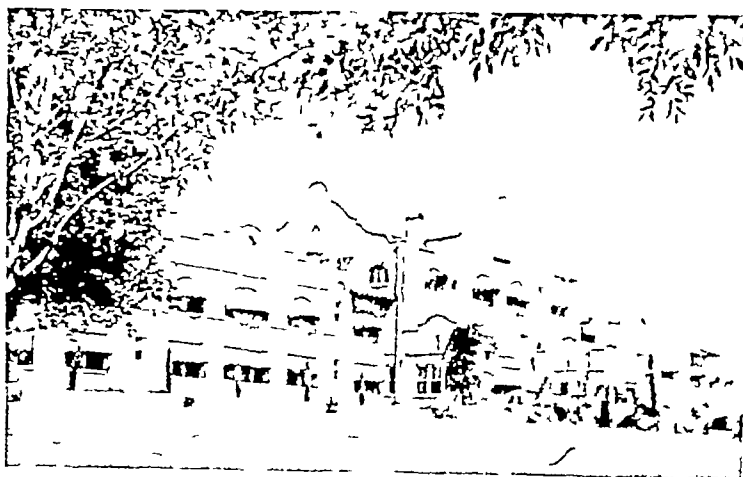
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# PULMONARY TUBERCULOSIS SURGERY AND THE SANATORIUM—(Continued from page 15)

through their operative intervention until their discharge from the hospital, and from that time onwards. Statistics as to the indications for pulmonary tuberculosis surgery and the results obtained by surgery will have, at that time, a correct and a permanent value.

To day, there is much hue and cry about the socialization of medicine. The opponents of any attempt to regulate the practice of medicine to an outside authority have entirely forgotten that in the treatment of pulmonary tuberculosis there has arisen a plan which is, for all practical purposes, socialization in its utmost form. The sanatorium is supported by the city, county, or state by funds obtained largely from taxation of its citizens. The physicians are, therefore, paid employees of whatever organization accounts for the expenses of the sanatorium.

Most observers will agree that, in the main, the job is well done and that tuberculous patients are cared for adequately. This should help to refute the argument that socialization of medicine will decrease the welfare of patients.

Whether the physicians in the sanatoria are adequately repaid for their efforts is a moot question. However, many sanatorium physicians seem to be content to live a life free from financial responsibilities and at the same time being a part, in some measure, in increasing the well being of humanity. Whether this type of existence is preferable to the usual one of the doctor in private practice, whose every day is filled with the uncertainty of monetary recompense and the strain of intense competition, is only answerable by each individual in the light of his own beliefs and philosophy of life.

## THE INFLUENCE OF PNEUMOTHORAX TREATMENT ON THE PROGNOSIS OF TUBERCULOSIS

—(Continued from page 21)

fect of pneumothorax on the contralateral lung in bilateral involvement is very frequently favorable, as shown in our series.

When we realize that artificial pneumothorax in the past has seldom been induced in a patient who has early disease and appears to be getting on well, it becomes more and more apparent that this procedure undoubtedly influences favorably many cases where otherwise the patient would be subjected to a long lingering illness and prolonged treatment with little prospect of being ultimately restored to health.

In conclusion, permit us to quote the following statement made by Allen Krause 20 a number of years ago: "All in all, artificial pneumothorax represents by far the greatest advance yet made in the special treatment of pulmonary tuberculosis. Time brings no dimming of its repute. Enlarging experience only adds to its lustre. Experience suggests also that its scope will enlarge that after ten years of trial and experiment we are settling down into a period of its more intelligent

employment which will lead to its further development.

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## THERAPEUTIC CHAOS IN BRONCHIAL ASTHMA—(Continued from page 12)

or myocardial impairment Abdomen slightly distended liver small slightly palpable Spleen not felt No masses Reflexes hyperactive

*Laboratory Examination*

Urine cloudy, specific gravity 1.014, reaction acid, sugar negative, albumen heavy trace, acetone negative, bile positive Blood Hemoglobin 79 per cent, rbc 4,510,000 color index .87, leucocytes 16,000, polys 83.5, lymphocytes 12.5, large mononuclears 4 Examination of feces for bile negative, blood sugar 98 mg per 100 cc Vandenberg showed a color change in 15 sec and complete in 60 sec Urea 19 mg per 100 cc of blood no leucin or tyrosin crystals found in the urine X-ray examination of the gall-bladder region, without the dye, was negative Patient was put on 10 degrees glucose intravenously, body warmth was maintained and fluids forced Saturated magnesium sulphate, two ounces, given through nasal tube Next day patient was more comatose, jaundice deepened and she expired on April 26, 1931, two days after admission

A sample of the preparation used by the patient in this case was submitted to the Department of Health of the City of Los Angeles with the following report

"Results of examination of sample submitted by you contained according to my findings, 5.57 per cent of Phenol Signed, J. S. Carman, Chemist

The tragic death of this patient from toxic jaundice as proven by autopsy, definitely proves the need of better control of the patent medicine market and of more cooperation between doctor and patient I believe this patient would have been greatly benefited by proper diet, elimination and hyperpyrexia treatment, and by a more thorough desensitization

Before I speak of the therapy of adult bronchial asthma, I wish to make it clear that in this paper I am primarily dealing with those cases of neglected bronchial asthma that form the bane of our lives Those intractable cases that are beyond the reach of the allergist and in which the secondary bacterial invasion of practically all respiratory organs has created such a pathologic state that only palliative measures can be hoped for

1 The Journal of Pediatrics Vol VII No 6 (Dec, 1935)

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2 Gastro-Intestinal Allergy L. P. Gay JAMA (March 21, 1936)

(To be concluded in the October issue)

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# Obituary



*Henry Sewall*

IT IS WITH A FEELING of deep reverence and loss, as well as an incapability of doing justice to the subject, that we undertake this slight tribute to a man whose

works, whose contributions to society, and above all whose human qualities of courage, determination, and gentleness, show the greatness of our loss, Henry Sewall

We know him mainly as a worker in the field of tuberculosis, but as Professor of Physiology at the University of Michigan, Henry Sewall's experiments in antitoxins were recognized as one of the outstanding achievements in this field of medical endeavor. A tablet has been erected at Ann Arbor to commemorate his work.

Even sickness could not dim his efforts. When pulmonary tuberculosis, its complications, and later typhoid, with rib necrosis, came his way, he removed himself to Denver, and while overcoming his own afflictions, assisted in establishing the research department of the National Jewish Hospital.

Born in Winchester, Virginia, May 25, 1855, Dr. Henry Sewall died from coronary thrombosis in Denver, July 8, 1936.

And while his achievements will live on forever in the annals of society and progress, we can think of no finer tribute than to say that in the memory of his patients and friends there will always be a niche for just Henry Sewall. L. B. K.

## ROCKY MOUNTAIN TUBERCULOSIS CONFERENCE—(Continued from page 7)

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Dep't of Preventive Medicine  
Tulane University of Louisiana

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John W. Flinn, M. D.  
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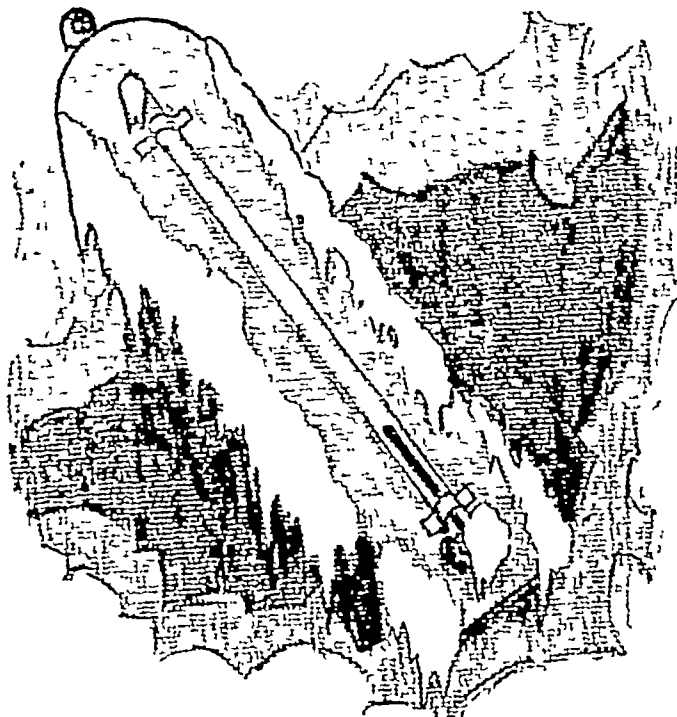
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MYRTLE AND VIRGINIA STREETS
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August 1, 1936

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'The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind'

Lawrason Brown, M D

Editorial Comment

Influenza and Tuberculosis

INFLUENZA undoubtedly has an influence on the development of pul-

monary tuberculosis. It is the general opinion of authorities that influenza prepares the terrain for the development of chronic catarrh and predisposes the organism of the patient to the development of the disease. Many authorities state that in at least 50 percent of their cases of pulmonary tuberculosis, the evolution of the diseases was related to an attack of influenza. As a rule the post-influenzal symptoms are so trivial that they are scarcely noticed at the time. Histories of these patients show a slow, but progressive loss of weight, slight fever in the evenings, weakness, and incapacity for physical and mental work. Cough and other symptoms, which erroneously have been considered as early symptoms of pulmonary tuberculosis are absent. Early diagnosis is possible, however, in these slow progressive cases following influenzal attacks, by estimating the symptoms given by tuberculous toxemia, the evaluation of which is important in controlling further development of the disease. It must be remembered that many toxic symptoms of tuberculosis may be present, when both the clinical and Roentgen examinations fail to prove the presence of tuberculosis.

C M H

Bring the Line up to the Flag

THE INNOCENT invasion of innumerable innovations in the social and

political application of modern medicine has seriously disturbed the sanctity of the individual medical practice. The ease with which doctors and their own medical organizations have been hoodwinked by so called socially progressive movements now becomes alarming. It is high time for the medical profession to assert its independence and take a firm stand against the camouflaged invasion of various movements into the practice of medicine. Cloaked with sappy sentiment and maudlin devotion to a chimerical ideal of serving humanity, many of the local, state, and national programs have actually absorbed many legalized and professional features of the medical profession. These movements have stolen the prerogatives of the practice of medicine to such an extent that the physician frequently becomes only the legalized symbol of medical practice.

The innocence with which many of these social betterment programs have been conceived, erected, and entrenched into our social, civic, and professional fabric is worthy of cold dispassioned analysis by our suffering profession. It seems reasonable to assert that we have been hoodwinked into programs that are now about to engulf and swallow us up.

All of these movements and invasions have been so innocuously imposed that we serve upon their boards, aid, abet, and support them. We are taxed to pay for our own competition.

But we alone are responsible for these disasters of progress. We have stood by and watched these movements develop. We have even taken a large part in their growth. We have helped to sprinkle them with sentiment and with argument, possibly with some measurement of personal aggrandizement. We must assume much of the responsibility for the local, state, and national success of many of these movements. Likewise, we must now demand that there are certain professional limitations to them. Have we allowed these movements too much freedom and are they now so entrenched that they are outside and beyond our control?

Surely there are more and better things than the present scheme of things, medical. There are more virtues in positive, progressive plans than in the negative attitude of mere preservation of the good old days. Times change and we must adapt ourselves to the changing times, but there is no sense in letting those with no medical training run away with the flags of medical progress. Bring the line up to the flag.

E H S

Tuberculin in the Treatment of Tuberculosis IN SPITE of the fact that the use of tuberculin and other protein extracts of tubercle bacilli as a therapeutic measure in tuberculosis came into disrepute shortly following Koch's announcement of its value, a respectable number of phthisiotherapists have continued its use in carefully selected cases with satisfactory results.

Like many other therapeutic measures its discovery and announcement were hailed with much enthusiasm and its adoption by a profession which was feverishly waiting for some remedy which would quickly cure tuberculosis was universal.

Men who knew little of the pathology of tuberculosis began its administration in

all classes of cases, and in all stages of the disease. Little attention was paid to the individual characteristics of the patient, or to the regulation of dosage according to the reactions which were obtained in its administration. On the other hand, the same suggested schedule of dosage was apparently used in every individual to whom the treatment was administered. As a natural result much damage was done and the use of tuberculin as a remedial agent was strongly condemned.

A small number of physicians, however, probably because they were more observant and more conservative in its use than the rank and file, continued to use it in carefully selected cases and with proper caution, and they have observed favorable results.

The manner in which tuberculin brings about the results which have undoubtedly been obtained, we believe, is not yet thoroughly understood.

Doubtless, allergy plays some part in it, but that subject is too exhaustive to discuss in detail. It is likely, too, that there is some effect upon the cellular content of the blood which increases the patient's immunity.

The most spectacular and satisfactory therapeutic results have been secured in the treatment of tuberculosis in the eye. This is probably due to the fact that the dosage can be more satisfactorily regulated as a result of the ability to observe the focal reaction in the eye.

The clinician, in collaboration with the eye specialist, can treat these cases more intelligently than where the infection is elsewhere in the body.

There are two types of chest cases in which good results have been obtained.

1 The patient with the very early lesion where there is little evidence of toxemia.

2 The patient in whom the disease has been present for a long period, but where there is little destruction of tissue, and there has been some improvement, but the disease is apparently stationary.

It must be remembered that tuberculosis is a disease which progresses very

slowly either way, and therefore rapid or spectacular results should not be expected from any method of treatment

It is our opinion, based upon years of experience, that if patients are properly selected, and due care is used in adapting the treatment to the individual, and one does not follow any so called schedule of dosage, good results will be obtained with the use of tuberculin R. B. H., SR

Rocky Mountain Tuberculosis Conference THE SECOND bi annual meeting of the Rocky Mountain Tuberculosis Conference will be held this year at Albuquerque, New Mexico on September 28th and 29th This Conference was organized on June 8th, 1932 at the annual meeting of the National Tuberculosis Association held at Colorado Springs, Colorado, that year The first clinical and sociological program was presented at Colorado Springs in 1934 More than Five Hundred physicians and others interested in tuberculosis attended the Colorado Springs meeting and the committee anticipates a larger attendance at the Albuquerque meeting this year

Dr LeRoy S Peters of Albuquerque is the President of the Organization, Dr H J Corper of Denver is the Vice President, and Dr Arnold Minnig of Denver is the Secretary Treasurer Dr Chas W Mills of Tucson is the Chairman of the Clinical Section of the meeting and Miss Helen L Burke, Executive Secretary of the Colorado Tuberculosis Association, is in charge of the Sociological Section

Members of the State Program Committee are Drs Charles O Giese, Colorado Springs, Colorado, Robert O Brown, Santa Fe, New Mexico, Samuel H Watson, Tucson, Arizona, H R Kanable, Basin, Wyoming, John F Allen, Omaha, Nebraska, Ralph C Matson, Portland, Oregon, Munford Smith, Los Angeles, California, Philipp Schonwald, Seattle, Washington, Lewis J Moorman, Oklahoma City, Oklahoma, Fannie Dunn Quain, Bismark, North Dakota, O F

Swindell, Boise, Idaho, and Robert B Homan, Jr, El Paso, Texas

A fine program is being arranged and the committee extends an invitation to physicians and others interested in tuberculosis to attend this two day Conference
M K

Pre-School Round-Up THIS is the season of the year that, in many cities and communities, brings the annual pre school round up of young children who are just beginning their education The complete physical examination of these children by the family physician, or in groups under the auspices of the county medical society is of great importance to their future health and the general health of that particular community

It is obvious that physical defects of all types and particularly those of sight and hearing should be discovered and corrected in order that the child will not be handicapped in the schoolroom The examination will be only partial, however, if it does not include a tuberculin test followed by x ray of the chest of all positive reactors It is well known that the accurate diagnosis of childhood tuberculosis is impossible through simple physical examination We believe that this test is as important as the smallpox vaccination

It seems to us that these examinations offer the private physicians an opportunity to be of inestimable service to their communities through preventive measures and the correction of defects which are so often the cause of suffering and disease in future life We cannot emphasize too strongly, therefore, that each examination be complete and include the Mantoux test An incomplete examination is worse than none at all because it gives the child's parents a false sense of security
R B H., JR

A "sour" patient is a patient with an unfavorable prognosis Keep your patient happy and you will be more likely to keep him healthy

Report of the Statistical Committee of the Federation of American Sanatoria

SHORTLY AFTER OUR Albuquerque meeting the Statistical Committee, there appointed, set about gathering information from sanatoria to be used by the business office of the Federation in working out a better understanding between public and private sanatoria

BY
E W HAYES, M D **
Monrovia, California

over 100 beds The average is 52 beds

In these institutions there were 1182 vacant beds on an average during 1935, which is slightly over one-third of the total available beds Five sanatoria reported no vacancies during 1935 Seventeen sanatoria reported one-half or more of their beds vacant during the same period

As a basis for this information a questionnaire comprising sixteen questions, suggested and approved by the committee, was sent to 146 sanatoria throughout the country A few of these sanatoria answered at once Others, perhaps not realizing that these statistics are necessary in order that the Federation may function, required as many as four follow-up letters, including air mail and special delivery, before replies were received This extended the work of the committee in gathering statistics well into the past month

Approximately one half of the 64 reporting sanatoria classify themselves as closed institutions

About the same proportion have one or more resident physicians Many which did not list a resident have the Medical Director living nearby and readily available

In all, a total of 101 replies were received These were sorted to determine the privately owned institutions which met operating costs and which were sufficiently interested in the work of the Federation to fill out the questionnaire We found sixty-four sanatoria in this classification, which offer the basis for our statistical summary.

Twenty-nine sanatoria are fully equipped with x-ray, laboratory, and facilities for chest surgery, according to their statement Twenty-three are so equipped except for major chest surgery, which is handled in nearby hospitals Of the sanatoria reporting no equipment, most are operated by individual doctors, who maintain their own x-ray and laboratory

At this point, I want to thank those sanatoria who submitted detailed and accurate answers to our questionnaire It was a task, but the Statistical Committee very much appreciates your response Some sanatoria, admittedly, gave rough estimates or indefinite and occasionally misleading statements so that their figures could not be used

The minimum rates in this group of sanatoria *without* medical attention range from \$10 00 to \$42 00 a week, with the average being \$20 95 The minimum rates *with* medical attention which, in most instances, includes pneumothorax and, in some instances, includes x-ray also, range from \$15 00 to \$38 50 a week, with the average being \$24 65 We noted that each section of the country seems to have its own competitive rate, which is met by the other sanatoria in that district One hospital, which received \$3 00 a day, extras added, for each of its tuberculous patients, felt that this could not be fairly expected to include medical attention

In these 64 private sanatoria, scattered throughout the country, there are 3348 beds available for tuberculous patients Twenty-five of these sanatoria each contain 30 or less beds Seven sanatoria have

The patients entering these 64 private institutions are largely referred by other physicians Forty percent of the sanatoria reported that almost all their patients

*Presented at the Kansas City Meeting, May 12, 1936

**President-elect, Federation of American Sanatoria

were referred, while a total of eighty per cent reported that half or more of their patients were referred by other physicians.

In general sanatoria located near large cities draw their patients from these cities, otherwise the patients coming from rural and urban centers are quite evenly divided, the number from urban districts being slightly greater than from rural. Likewise, most sanatoria draw their patients from their own state or adjacent states, except in the recognized health centers, where patients come from all parts of the United States, Canada and Central America.

Only 25 sanatoria reported the condition of patients upon entering their institution. Fifty-two percent of these were far advanced cases, 34 percent were moderately advanced and the remainder were minimal or early cases. According to the reports we received, all except one private sanatorium have the vast majority of their patients in the first two classes.

In no reporting sanatorium did the death rate exceed 30 percent, the average being between 6 and 7 percent.

The extent to which collapse therapy is used varies greatly with different sanatoria. Three reported only 3 percent of their patients so treated, while four sanatoria reported 80 percent of their cases so handled. These were the extremes, with the average in all sanatoria being 34 percent.

The length of the patient's stay, likewise, varies greatly with each sanatorium, the minimum being three months, the maximum being three years and the average being a little over nine months. Many of the sanatoria keeping their patients but a few months consider themselves as schools to teach the patient a correct mode of living to combat his disease. The patient's finances, in many instances, are the determining factor in the duration of his stay in the sanatorium.

In 15 of the 64 sanatoria considered, 75 percent or more of the patients leave after being discharged, in 10 sanatoria 25 percent or less are discharged. The

average is 52 percent. The remainder of the patients leave of their own accord without the approval of the physician in charge.

In these reports it was stated that practically all these patients return home and some 17 percent, on an average, return to work. These, of course, are estimates, since only four of the reporting sanatoria keep follow up records, with one other just commencing. Many sanatoria keep in touch with former patients through visits and letters. The figures from two of these sanatoria with follow-up records are appended.

It is the purpose of this committee to send out subsequent questionnaires from time to time in order to keep available information as up to date as possible. We trust that with a better understanding on the part of the sanatoria their response will be more prompt and perhaps more accurate.

The first sanatorium reported on the patients for the life of the institution. Reports were received from 2064 patients. Of these

1659 or 88.1% were reported alive
56 or 2.97% were reported dead
73 or 3.88%—no information as to whether living or dead
95 or 5.05% could not be found by postal authorities

Of the 1659 reported alive

1501 or 90.48% were in satisfactory state of health
129 or 7.77% were in unsatisfactory state of health
29 or 1.75%—physical condition indefinite

The report from a second sanatorium covered the years 1929 to 1934 inclusive and was based on the results of treatment with or without pneumothorax.

	With Pneumothorax	Without Pneumothorax
Well and working	40.6%	18.8%
Alive but not well	7%	14.6%
Dead	43.5%	54.6%
Untraced	8.8%	12%

The third sanatorium reported that after five years 90 percent of their patients showed no change, while 10 percent were worse.

The fourth sanatorium reported that after five years 25 percent were dead.

Compression Therapy in Far Advanced Pulmonary Tuberculosis

DISEASE ARREST in far advanced pulmonary tuberculosis often requires some radical procedure of compression therapy.

BY
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It may be necessary to employ a combination of well selected procedures before the desired aim of therapy is obtained. Therefore, it seems essential that one should be able to estimate fairly accurately just about what result can be expected from any particular procedure of compression therapy. He should not only have a working knowledge of the individual methods but should be able to use these various steps in such combination as to best suit the needs of the particular patient to bring about the most immediate cessation of the activity of tuberculous foci. This knowledge is extremely essential and we believe that it is knowledge that can only be gained through experience.

The majority of our patients whom we are called upon to treat are in the advanced stage of tuberculosis. It is estimated that 80 percent of the patients admitted to Sanatoria throughout the country have the disease in an advanced stage. The average tuberculous individual usually does not consult a physician until symptoms are well pronounced, usually they have existed for some time. Frequently the x-ray film made at the time of the initial examination shows definite cavity formation. Rather frequently routine x-rays are not made and through an error in diagnosis further disease progression is permitted. Proud as we are of our advance in the medical sciences, unfortunately the majority of the profession do not share in this advance and patients suffer. The extensive campaign which has

been carried on urging early diagnosis in tuberculosis apparently has not accomplished the one essential,

that of physicians being tuberculosis conscious. Many instances of a failure to diagnose the condition clearly demonstrate that the physician simply did not keep tuberculosis in mind. Much has, however, been accomplished along the line of early diagnosis by our tuberculosis surveys made of school children and college students.

It seems that with our present knowledge and methods of conduct we will have with us the usual run of far advanced tuberculous patients.

The problem of obtaining and maintaining disease arrest in these far advanced patients often seems rather remote, but a proper selection of adequate measures often yields satisfactory results. Even a hasty consideration of these patients convinces one that treatment, of necessity, should be rather drastic in character. The vast majority that have the disease bilaterally, are of long duration, and no one procedure, no matter to what extent it may be one's hobby, can universally attain the desired aim of therapy.

It seems that there is becoming manifest, in our field of endeavor, two outstanding faults, one being a tendency of individuals to really inadequately treat patients because of an adoption of a particular method of therapy as a hobby. The other is a tendency of those more surgically minded to employ only surgical methods, ignoring the several valuable and definitely well established medical methods. Many attempts to greatly shorten the period of treatment by recourse to rather radical surgical measures upon patients in whom the extent of the tuberculous process is of a character and distribution entirely too minimal to war-

*Published by permission of The Surgeon General U. S. Army Medical Service, Fitzsimons General Hospital, Denver, Colorado. Read before the Denver Sanatorium Association, March 6, 1936.

**Major, Medical Corps, Clinical Director of the Enlisted Tuberculosis Section.

rant therapy so drastic in nature, are made

It seems that the individual who acts as the directing force of an institution or of a group should maintain a rather even keel when it comes to the selection of patients for a particular procedure or combination of procedures of collapse therapy. Unbiased, well balanced ideas regarding therapy, without undue stress of any one method, result in a selection of therapy best suited to the particular problem encountered. No one can "ride" a special "hobby" in therapy without giving it undue consideration at the expense of other well recognized steps in treatment and this may prove detrimental to the patient. These individuals tend to defend their position by unwarranted condemnation of some of our best procedures of therapy. For example, if they prefer not to use pneumothorax at all or but rarely they verbosely discuss and tend to magnify the difficulties and complications of induced pneumothorax. Complete or partial pleural symphysis, the prevalence of pleuro pulmonary adhesions, the difficulty of dealing with pleural adhesions, the incidence and severity of attendant complications, long duration of the therapy, and the ever present potential danger of reactivation even after pulmonary reexpansion are discussed fully in order to discredit pneumothorax as a method of therapy in tuberculosis. This action on the part of individuals often considered rather outstanding in the surgical field, may have a decided influence, likely detrimental, upon those physicians who are yet in the formation stage of their ideas concerning therapy in tuberculosis.

There are, of course, many patients presenting a type and distribution of nodose tuberculous lesions so extensive as to involve the lung fields that thoracoplasty is precluded and phrenic nerve surgery is inadequate. Compression therapy. Patients presenting the pneumonic type of tuberculosis or with recent extensive midlung spread resulting from bronchogenic aspiration from the oppo-

site lung are not suitable patients for thoracoplasty. Patients with thoracoplasty who develop in the contralateral lung a bronchogenic spread or a reactivation of lesions already present are not best suited for radical surgical collapse.

In any large series of patients one finds many many examples where thoracoplasty is unsuitable as the proper method of therapy. These patients are far more suitable for pneumothorax treatment, for by its use it proves to be adequately effective in that the disease is arrested and that in the end it is more conservative, since a greater amount of lung tissue is preserved for future function. Though the superiority of radical surgical collapse may be greatly stressed from all of its advantageous angles we will always have far advanced tuberculous patients presenting conditions of a nature to preclude thoracoplasty, but who, on the other hand, are suitable for pneumothorax therapy.

We are of the opinion that there are definite indications for each of the modern methods of therapy in tuberculosis, as well as indications for their use in various combinations. Often the indication for a certain procedure may not be so definite that other measures may not require consideration. In other instances the indication for some one procedure seems very definite. We prefer to use phrenic nerve surgery, pneumothorax therapy, the various modifications of thoracoplasty, intrapleural pneumolysis, etc., selecting the particular type of therapy, or a combination of the various types, as to best suit the needs of the individual patient. In many patients we have used about the most radical treatment possible, but in so doing, it was absolutely essential in order that the therapy be adequate in character. Treatment should be adequate, compression should be effective, yet by employment of measures, as conservative as possible.

In far advanced tuberculous patients one should select, if possible, the simpler more conservative measures, yet select ones sufficiently adequate to effect disease arrest, always attempting to visu-

lize the end result as to conservation of functioning pulmonary tissue, and the effect of compression upon other thoracic organs especially the heart. Since we wish our patients to purchase their health at the lowest possible cost in lung tissue one may be justified in attempting simpler methods more or less as a trial, reserving the more radical types of therapy for failures encountered. In doing so, however, ineffective therapy should not be employed initially when it is more or less clearly seen that the particular measure will be inadequate, and when there is some interference to make the procedure definitely ineffective, it should not be unduly prolonged before additional adjuncts of therapy are employed. Workers may be extremely radical in inducing collapse therapy yet present a definite conservative trend in that therapy used in a particular patient seems to be absolutely required for disease control or arrest. The successful therapist recognizes the necessity of supporting the more modern compression adjuncts of therapy by prolonged rest regime.

Bilateral Pneumothorax Therapy

In the majority of our patients with advanced bilateral tuberculosis we first consider them as candidates for bilateral pneumothorax induction. Our experience with these patients leads us to believe that it is rather difficult to accurately conclude whether or not the gaining of an effective pneumothorax space is possible or impossible, though we consider all available data. We believe that in the vast majority of cases the patient should be given the advantage of an attempt at induction. This belief we have held and followed over a period of more than six years during which period we have performed over 1000 initial pneumothoraces without a death by air embolism.

In our infirmary wards today 71.3 per cent of the patients have had some form of collapse therapy induced. Of this number 43 per cent have only unilateral pneu-

mothorax. 14 per cent have bilateral pneumothorax, 8 per cent have thoracoplasty alone, 5.7 per cent have had phrenic nerve surgery as the sole procedure of compression while the additional patients have had a combination of the various procedures. For example, 20.9 per cent of all pneumothoraces have as an adjunct to that therapy phrenic nerve surgery either in the form of an excision or temporary paralysis, usually in the form of permanent, hemidiaphragmatic paralysis. We, therefore, have in our infirmary wards 28.7 per cent of the patients who have no form of collapse therapy. Some few of this group have far advanced, fibrous type of tuberculosis and are elderly patients in whom the optimum time for induction of collapse therapy is long past. Some few others refuse treatment and we always have a group of patients in whom pneumothorax is impossible because of the lateness in the stage of the disease when admitted at our institution and in whom other methods of treatment seem unsuitable. In all these patients there was a time when collapse therapy was indicated, but, unfortunately, it was not accomplished.

The difficulties encountered in the induction and in the maintaining of pneumothoraces bilaterally are great and one is, indeed, fortunate to attain his objective. Frequently additional adjuncts or radical surgery have to be employed instead of continuing the pneumothorax on one side or the other because of partial pleural symphysis or extensive pleuropulmonary adhesions. Experience with bilateral pneumothorax has taught us much concerning the healing of tuberculous lesions and closure of pulmonary cavities under negative intrapleural pressure with partial pulmonary compression.

There has always been considerable discussion in regard to the amount of pulmonary compression essential to produce disease arrest. Some advocate rather complete pulmonary collapse under pneumothorax, stating that this is essential in order to heal tuberculous foci. They be-

lieve that the positive intrapleural pressure required to accomplish this is not a factor of complications of the therapy. Those advocating partial pulmonary compression or the expansile type of pneumothorax believe that the lung rest obtained is sufficient to permit healing, that complications are less under constantly negative intrapleural pressure and that the gaining of pulmonary expansion at the termination of the therapy is more easily obtained. Since about 40 per cent of artificial pneumothoraces have pleural adhesions traversing the pneumothorax space visualized on the x-ray film, since bilateral pneumothorax is advocated by many workers and due to the fact that contralateral pneumothorax is used in the presence of thoracoplasty, there are examples of instances where complete lung collapse is impossible or inadvisable yet excellent results are obtained under the partial compression. We have advocated and used the expansile type of pneumothoraces and have obtained excellent results.

It seems rather obvious to us that in many patients one has to content himself with only partial compression or else classify a rather high percentage of his pneumothoraces as unsatisfactory. As a matter of fact, some few workers are inclined to do this and in a rather too hasty manner suggest discontinuance of the pneumothorax and the substitution of thoracoplasty. Unwarranted delay in inducing therapy sufficiently adequate to supplant an inadequate type is not justifiable and may prove to be a costly error in judgment. Undue haste with permanent sacrifice of pulmonary tissue capable of future function, if treated more conservatively, may also prove to be an error rather detrimental to the patient. It seems important, before concluding that pneumothorax will not accomplish the aim of therapy, to carefully consider the precompression lung pathologic changes, the effect of compression on that pathologic condition, and make a careful estimate of the situation in order to determine whether or not the pneumothorax is yet

capable of producing results. In certain patients it may be clearly shown that eventually a thoracoplasty will be necessary, but further treatment by pneumothorax may clear areas of the lung, thereby limiting the extent of thoracoplasty required later.

Too much clinical significance is attached to pleuro-pulmonary adhesions by many doing tuberculosis therapy. While adhesions are troublesome in pneumothoraces in that they limit lung compression, hold cavities patent, and are etiologic factors of certain complications of the therapy, the majority of pleural adhesions are not clinically urgent matters, as some would have you believe, in that they require no special adjuncts of therapy. Even when cavities are only reduced in size and are yet patent ones, there is no set interval of time when one should definitely state that other measures are demanded. The minority of adhesions are of definite clinical significance and should receive special attention. In our experience, during the past few years, the addition of hemidiaphragmatic paralysis is an adjunct to the pneumothorax will suffice to close the vast majority of these cavities held patent by adhesions. Certainly closure of these cavities should first be attempted by phrenic nerve surgery, reserving intrapleural pneumolysis with cauterization of the offending adhesions for those patients who have failed to close their cavities by phrenic nerve surgery.

Notwithstanding all of the difficulties encountered, we have found bilateral pneumothorax therapy a very successful procedure. We have used this type of treatment in 150 patients, many of whom have been carried on to completion with reexpansion of the lungs. The complications encountered are frequent and often severe, but one should remember that he is dealing with far advanced tuberculous patients often with depressed tuberculo-immune qualities and in whom the prognosis for recovery is practically hopeless without collapse therapy. In considering the possibility of complications, one should remember that in far advanced

tuberculosis untreated by compression certain pulmonary as well as extra-pulmonary tuberculous complications such as laryngitis or enterocolitis may soon make their appearance, possessing a gravity far outweighing the usual complications of bilateral pneumothorax

In 1931 we stated

1 Advanced bilateral pulmonary tuberculosis may be arrested by bilateral pneumothorax

2 Bilateral cavitation may be eradicated

3 A rapid fatal termination from bronchogenic spread to the contralateral lung may be prevented by converting the case from a unilateral to a bilateral pneumothorax

After five more years of experience we do not wish to substantially alter these conclusions

Thoracoplasty and Contralateral Pneumothorax

In patients with bilateral tuberculosis sufficiently far advanced to warrant bilateral collapse and in whom pneumothorax is impossible or definitely inadequate as to type of collapse obtained and in whom phrenic nerve surgery fails to accomplish the desired result or is considered an unsuitable procedure *thoracoplasty* is performed in the presence of contralateral pneumothorax. When this is considered absolutely essential in order to accomplish disease control, we are, indeed, dealing with therapy rather than radical. Especially is this true in patients with extensive lesions and larger cavitation. This type of radical collapse therapy is possible because of the use of an expansile type of induced pneumothorax and because the thoracoplasty, while radical as to the length of ribs removed or resected, is limited in that the operation is restricted to those ribs just sufficient to collapse the involved area of the lung.

Thoracoplasty in these patients is delayed until the pneumothorax is well established and can be maintained by

small refills at weekly or ten day intervals. When possible, without undue hazards to the patient, we have delayed the thoracoplasty until the pneumothorax has the disease of the contralateral lung definitely under control. In selected patients we attempt to prevent further progression of disease in the lung selected for collapse by thoracoplasty with hemidiaphragmatic paralysis or by continuing the inadequate pneumothorax.

When thoracoplasty is performed it should be well planned and divided into several stages, each being sufficiently minimal in order to avoid an undue operative risk. The upper three ribs are removed in their entirety, but additional stages should be less radical in that only the bony portions of the ribs are resected. When cavities remain patent following the above operative procedures, an antero-lateral stage may then be performed, inducing complete pulmonary collapse with cavity closure. This manner of planning the operation ultimately produces complete collapse, but accomplishes the collapse so gradually that the patient has an opportunity to adjust himself to each decrease in pulmonary function. Rather than radical collapse may be obtained in the presence of an expansile contralateral pneumothorax with both procedures sufficiently adequate to result in disease arrest if induced gradually as outlined above.

We have performed thoracoplasty in the presence of a contralateral pneumothorax in 20 patients and have induced pneumothorax contralaterally following thoracoplasty in several other patients with only one operative death. In one patient death followed a superimposed spontaneous pneumothorax on the pneumothorax side three days after the thoracoplasty. Of this series, ten patients have been carried on to completion of treatment in that the pneumothorax therapy has been completed and pulmonary re-expansion accomplished. Considering the entire series, 71.4 per cent of patients have closure of cavities bilaterally with negative sputa while 28.5 per cent present

patent cavities with positive sputa. Further surgery may yet be utilized in a few of these patients who still have patent cavities. It is believed that in this type of work failure to close cavities is not because of inability to perform a technically satisfactory thoracoplasty, but more because of inadequate rib resections as a forced issue. These patients, especially those with large infraclavicular cavities, are unable to withstand the more radical stages of thoracoplasty and one should be content with marked reduction in the size of cavities and utilize further surgery at a later date when the patient has somewhat adjusted himself to the induced collapse of the lung.

Thoracoplasty

Thoracoplasty is one of the greater advances in the treatment of pulmonary tuberculosis. When definitely indicated, there is no other therapy which can take the place of surgical collapse by thoracoplasty.

Our thoracoplasty patients are selected from the group in whom pneumothorax can not be induced at all or in whom the collapse obtained is inadequate and from phrenic exeresis patients in whom simple hemidiaphragmatic paralysis fails to yield satisfactory healing.

We attempt to use more conservative methods of therapy initially, reserving thoracoplasty for the failures of other therapy.

Selection of patients for surgical collapse should be made by a phthisiologist. All phases of therapy in tuberculosis should be under the guidance of the phthisiologist. He should select patients, choose the time of operation, recommend the type of thoracoplasty and number of stages, attend the patient during operation, assist in postoperative care, and supervise the necessary rest therapy following surgery.

In the past, it has been rather difficult to know the exact extent or type of various operators' thoracoplasties. More and more thoracoplasty is coming to mean re-

moval of the first three ribs in their entirety, including the vertebral transverse processes, with extremely wide resections of ribs sufficient to gain adequate collapse of the involved area of the lung. When cavities remain patent they should be reoperated with removal of regenerated ribs and further resection of the rib cartilage anteriorly. A more radical reoperative procedure consists of removal of regenerated ribs with the introduction of an extra periosteal gauze pack.

The removal of ribs in their entirety or the extremely wide resection of the lower ribs requires more operating time and the resultant collapse is great and the procedure is not well tolerated by the chronically ill patient, therefore, the number of ribs removed or resected is necessarily limited. Left sided operations require considerable caution. It seems that in a great many patients it would be better to perform the upper stage (3 ribs) and at subsequent operation resect only the bony portion of the ribs and then perform an anterolateral for removal of the cartilages of the ribs. The results obtained by thoracoplasty as to closure of cavities are variable as to the percentage of closures as reported by various workers. It is believed that this is due to the type of operation used and is also influenced by reoperative procedures. If one should delay his report until all patients showing patent cavities, following routine thoracoplasty, have been reoperated then the percentage showing cavity closure should exceed 90 per cent.

We have suggested that, since rib removal rather than resection is the order of the day in thoracoplastic surgery, the operation should be less radical posteriorly and followed by an anterolateral operation. The division of an adequate thoracoplasty into too many phases, while it lessens the operative mortality, has an objection in that patients object to too many operations. This may seem a rather illogical point to consider, but we have had several patients refuse further operative treatment when the job

(Continued to page 26)

Indications for Resection of Lower Ribs Following Apicolytic Thoracoplasty

WHEN THE Sauerbruch paravertebral thoracoplasty was first put into practice it was the custom to perform the operation in one stage.

Then, when the danger of so great a procedure became evident, two or more steps replaced the single one, and at once the operative mortality was reduced.

The usual procedure was to begin the collapse by resecting the lower ribs, leaving the upper ones until the last. But it is exactly these upper ribs which are responsible for the maintenance of pulmonary cavities in the apex and upper lobe of the lung where they are most frequent.

The next improvement in technique was to begin the operation by resecting the upper ribs as the most logical sequence, dividing the plastic into two or more stages, the lower ribs being the last to be resected.

Finally, it was recognized that if the first rib was completely removed with large sections of the second and even the third, the chance of upper lung collapse would be better. But even with the most painstaking work a number of the cases were not ideal and, though great x-ray improvement was manifest, tubercle bacilli continued to be present in the sputum because secreting tuberculous areas were still present. Evidently, we were unable by mere extirpation of ribs to exert in all cases sufficient pressure upon the walls of the cavities to bring them firmly together.

Apicolysis was undertaken, at first, after unsuccessful thoracoplasty, and the outlook for permanently effacing the cavern was thereby improved. But whether the apicolysis was done by packing with gauze or by implanting foreign substances such as paraffine as a permanent plug (plombage), everything depended upon the maintenance of the obliteration secured at the time of operation, a consum-

BY

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mation devoutly to be wished for, but by no means certain of achievement.

For a number of years I have employed a device which seems to have advantages over others since there is provided constant elastic pressure which increases the size of the new extra pleural space. Without distress to the patient, this forcibly approximates the walls of the tuberculous cavity.

I have several times described the procedure^{2, 3}, so it will now be merely referred to by stating that the salient point is to resect subperiosteally the upper three to five ribs, according to the size of the diseased part, and to make a space by digital pressure upon the tissues beneath the ribs including the periosteum, the endothoracic fascia and the pleura, usually adherent to the lung, and filling this space with elastic crumpled rubber dam. The dam is buried in place by suturing the soft parts of the chest wall over it but leaving enough protruding through the wound so that it may be removed in three or four days. X-ray films made before the rubber has been extracted will reveal a space outside the pleura, two to four times larger than that secured at the operation. A soft drainage tube is inserted, and pressure by elastic rubber sponge strapped over the infraclavicular region and in the axilla will tend further to effect compression. The results in my hands have been gratifying, and in later operations I have left the first rib uncut. The cases in which this modification has been tested have given me further encouragement, and I hope soon to publish a full description.

And now, coming to the matter suggested by the title of this little paper, I find that there is not much to say which is not fairly obvious. Given a well functioning opposite lung and a lower chest

on the side of operation which contains healthy or quiescent, though perhaps infected pulmonary tissue, there is, to say the least, no reason for haste in completing the thoracoplasty, even in the presence of doubtful areas.

When there has been no previous phrenic nerve interruption, this procedure is now advisable with a subsequent period of observation which will finally determine the necessity for the resection of the lower ribs. If the phrenic has already been crushed or cut, the period of delay after the apicolysis should be shorter because the hope of favorable progress following the nerve blocking is absent.

When there is active disease in the remainder of the lung which will probably yield to compression, resection of the lower ribs in one or more stages should be undertaken with as little delay as possible, the urgency is greater when cavities are present or when the alarm of hemoptysis occurs.

Occasionally the apicolysis may have obstructed a lower bronchus or even the lower lobe bronchus with resulting atelectasis. If things are progressing satisfactorily in other respects, this accident by no means signifies that there is haste in completing the thoracoplasty, for the occluded passage may become pervious with full restoration of pulmonary function.

Efficient artificial pneumothorax in the pleura below the apicolytic field may be continued until the lung is well enough to reexpand or until it becomes clear that this form of therapy is futile, when the completion of the plastic is in order.

Non tuberculous empyema in the lower pleura of the tuberculous side and in the presence of presumably "good" lower lung should be treated according to the rules of thoracic surgery. Thus the non tuberculous part may be saved. If, however, the empyema is tuberculous, drainage followed by lower thoracoplasty is the treatment most likely to produce an arrest. It should not be forgotten, however, that even here the lower part of the lung may be worth saving, and that it

may resume its function when the empyema has disappeared. Such a result is, however, unfortunately rare. Benign obliteration of the pleural space by adhesion of visceral and parietal layers will almost certainly occur.

Concluding Remarks

1 When the principal location of destructive tuberculosis with cavity formation is in the usual place, the apex and the upper portion of the superior lobe, it is manifest that here should be the field of primary surgical attack.

2 This should have for its object, as a general rule, the total compression of the diseased portion with its cavities harboring bacilli which are being expelled by cough, to the public danger.

3 Instead of the wasteful destruction of healthy pulmonary tissue formerly brought about by complete thoracoplasty, we should do all in our power to preserve healthy lung. Not only is this the correct procedure from the surgical point of view, but if at some future time the patient must fight a pneumonitis or some other spreading pulmonary lesion, every area of functioning lung may be of life saving importance.

4 Upper thoracoplasty with direct apicolytic compression should be our first step in nearly all cases looking toward the direct abolition of tuberculous spaces. If the lower portions of the lung are not obviously hopeless, little will be lost by vigilant delay.

5 In the doubtful cases, the advice of an experienced phthisiologist is indispensable to the surgeon.

6 The physician should call for surgical counsel as soon as the idea of operative treatment is considered.

(1) Lillenthal Howard. Logical Sequence in Two-stage Thoracoplasty. Arch Surg, 1927 vol 14, Part II.

(2) Ibid. Pulmonary Tuberculosis. Recent types of operation. J A M A, April 14 1934 vol 102.

(3) Ibid. Pulmonary Tuberculosis. Thoracoplastic Apicolysis. Jour Internat de Chir. Tome 1 no 3, p 11.

Hemorrhagic Bronchitis

THE SPITTING of blood from the respiratory passages has always been considered the evidence of a

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agents in the condition described as hemorrhagic bronchitis

tuberculous infection until proven otherwise. Before the universal use of the microscope and x-ray it was very difficult to classify cases of hemorrhage from the respiratory tract. Careful investigation with the microscope and x-ray is proving that a large number of these cases are not tuberculous, but are caused by various other infections or conditions.

I will not attempt to go into a lengthy discourse on the differential diagnosis of blood spitting, but will only try to describe and report a series of proven cases of a condition that was first recognized by the French. Until a comparatively recent date this condition found very little place in the literature of America. This condition, as I term it, is hemorrhagic bronchitis. One name applied to the disease was Catellani's hemorrhagic bronchospirochetosis. It was apparently carried into France by Asiatic laborers and soldiers, and studied anew during the war by Violle, Dahmier, and others (*Presse medicale*, July 5, 1917, July 18, 1918, and March 10, 1919).

It is a well known fact that the bronchial tree and mouth may harbor a large variety of organisms without undergoing a definite pathological change or showing symptoms and I am only reporting cases where we were able to find the combination of fusiform bacilli and a large number of spirochaetes and symptoms that cause the patient to seek medical aid.

A large percentage of these cases were treated by me personally. Repeated microscopical examination of smears from the throat, oral cavities, and bronchial sputum showed the disappearance of these spirochaeta and fusiform bacilli, also the clearing of symptoms after treatment. This, in my opinion, establishes the fact that they were the causative

We did not include cases that had gone on to lung abscesses, lung gangrene or complications with bronchiectasis. About forty cases have been found in the past five years at our clinic.

There were two cases in this series that were known to have chronic fibroid pulmonary tuberculosis, but I proved to my own satisfaction, by careful examination and observation, that the blood was not caused by a reactivation of the tuberculous lesion. Both cases reacted well to sodium bismuth thio glycollate and neoarsphenamin treatment.

The Sodium Bismuth Thio Glycollate used was a watery solution given intramuscularly, doses administered according to the patient's weight (0.2 grams, or 3 grains, for an average person of one hundred and fifty pounds) were given every fourth or fifth day. The reactions were carefully watched and the kidneys checked before and after treatment. Usually six to ten injections were necessary before the condition cleared.

Neoarsphenamin was used in small doses, 2 to 3 grams, once a week, intravenously for six to eight doses.

The physical findings in these cases were not at all constant, in some instances they were very slight, but they were always more marked in the bases of the lungs. The x-ray findings were likewise inconstant, but confined to the hilus region and bases.

The condition generally consists of a relatively mild bronchitis, but one which is accompanied by bloody sputum containing innumerable spirochaetal organisms. The period of incubation is short (one to two days), soon the patient begins to complain of a slight pain in the tracheobronchial region, he is seized with a harsh, annoying cough—almost exclusively at night, and expectorates a certain

amount of mucus and blood. The sputum presents a characteristic appearance, being homogeneous, rose colored, and comparable to curdled jelly; it is copious and soon becomes mucopurulent and greenish. After a few days intermission a fresh exacerbation occurs with elimination of the same kind of sputum. The latter contains enormous numbers of the *spirochaeta bronchialis*, which are characteristically variable in their morphologic features. This germ is met with in the discharge from the lungs, also from the throat and mouth.

Where the possibility of this disorder has not been kept in mind and bacteriologic examination of the sputum has been omitted, a mistaken diagnosis of tuberculosis as almost sure to be made. This condition is found in subacute and very chronic stages, sometimes going on to an abscess, gangrene or bronchiectasis if it is allowed to continue untreated.

The germs concerned in this disorder can be clearly seen upon examination of fresh sputum between a slide and cover glass. They occur either singly or in dense clumps. When free, they are actively motile, appearing as small vibrating cords. When their motion slows down, the wave like movements show greater amplitude as well as reduced rapidity; the *spirochaete* resembles an eel slowly worming its way past a series of obstacles.

Beautiful preparations may be obtained with the ordinary stains, such as gentian violet, crystal violet, and so forth. Interpretation of the smear is rendered very easy, however, if the silver salt method of staining is employed. The *spirochaeta bronchialis* appears stained a beautiful black against a red brown background and cannot be missed even upon the most cursory examination.

In some cases extreme nervousness, fatigue, temperature, loss of appetite and all the subjective symptoms that go with pulmonary tuberculosis are found. We did not use an intradermal tuberculin test on these cases.

The blood picture varied very much, but in no case showed marked signs of

leukocytosis. Therefore, I do not consider this symptom worth checking, other than in a general measure. Hemoglobin varied markedly from sixty to ninety percent. This was also not constant with the improvement other than in a general way.

I submit the following fourteen cases, omitting irrelevant history and symptoms.

Case 1 female, 25 years. Her history and symptoms were as follows. She had a severe cough, rusty sputum, occasional hemorrhage, foul breath odor and was extremely nervous. Her physical findings were a few scattered sonorous and sibilant rales over both lung bases. The x-ray showed her right lung slightly increased in all linear markings, more marked in the base. The left lung showed an area of increased density in the upper portion of the lower third to the fifth interspace. Laboratory findings showed that the gums and throat, as well as the bronchial sputum, were positive for fusiform bacilli and *spirochaete*. The bronchial sputum was negative for tubercle bacilli. This case was treated with Neo Arsprhenamine, 3 gram weekly for ten weeks, and the results were good. The same condition recurred within two years, but after the same treatment equally good results were obtained.

Case 2 male, 30 years old. His history and symptoms consisted of severe hemorrhage, eight to ten ounces, for two months before entering the sanatorium. He had lost a little weight and complained of slight fatigue, a medium cough, and expectoration. There were very slight physical findings at the time of his admittance, with the exception of his mouth and teeth. There were several badly decayed teeth in his mouth and the gums were soft, spongy, and pussy. The x-ray revealed irregular bronchial markings with a questionable multiple abscess. The left lung showed increased hilar markings with a few calcified tubercles. Smears from the gums and throat were found to be positive for fusiform bacilli and *spirochaete*, but was negative for tubercle positive for fusiform bacilli and *spiro*

chaete but was negative for tubercle bacilli. We treated him with Sodium Bismuth Thio Glycollate, intramuscularly, using 0.2 grams, or .3 grams, weekly. After the second injection the removal of the bad teeth was started. The results on this case were good.

Case 3 female, age 38. She had a history of arrested chronic fibroid pulmonary tuberculosis. For ten days prior to her entrance to the sanatorium she had had low grade afternoon temperature and a series of small hemorrhages, followed by streaked sputum. The physical findings were in the right lung there was a marked increase in very harsh breath sounds and there were a few scattered medium coarse rales. There were medium coarse rales scattered over the greater portion of the left lung and diminished resonance over the entire lung area. The x-ray revealed that there were a number of scattered, healed, tubercles throughout the greater portion of the right lung. There was some increase in linear markings in the upper portion of the lower third of the right lung. The heart shadow was displaced approximately one inch. There were numerous scattered healed tubercles throughout the entire left lung. The diaphragm was two and one half inches higher on the left side than on the right. This was the result of a phrenic evulsion four years previous to that time. Smears from the gums and throat, as well as the bronchial sputum, were shown to be positive for fusiform bacilli and spirochaete. The bronchial sputum was negative for tubercle bacilli. This case was treated with Sodium Bismuth Thio Glycollate, 0.2, intramuscularly, every ten days for five doses. The results were good. This patient had been teaching for a year with no toxic symptoms and we had no reason to connect her hemorrhage with her chronic tuberculosis condition. She returned to work after six weeks of the Sodium Bismuth Thio Glycollate treatment and is doing splendidly.

Case 4 a young woman, age 29. She had a history of arrested chronic fibroid tuberculosis. Her symptoms consisted of

a hemorrhage of from one to two ounces, a slight cough, and low grade afternoon temperature. The physical findings were harsh breath sounds with medium coarse rales over the upper third of both lungs and slight diminished resonance over the same area. The x-ray showed marked fibrosis of the upper third of the right lung with increased linear markings throughout the entire lung. The left lung showed marked fibrosis with calcified tubercles in the upper third with a few scattered, healed, tubercles in the hilus region and base. There was no evidence of active tuberculosis. Gum and throat smears and the bronchial sputum were positive for fusiform bacilli and spirochaete. The bronchial sputum was negative for tubercle bacilli. Neo Arsphenamin was used intravenously, 2 gram every ten days for six doses, producing good results. This patient continued to work while taking the treatment.

Case 5 male, age 40. This patient had hemorrhages several weeks after a fall. Examinations by different specialists failed to make a direct connection between the fall and the hemorrhages. He had a slight cough and expectoration. There were a few scattered coarse rales in the lower third of the right lung, otherwise both lungs were apparently normal. The x-ray revealed in the right lung a marked increase of linear markings throughout the hilus and lower third with some small scattered irregular shadows, which did resemble tubercles. The left lung showed a marked increase of linear markings in the lower portion. Smears from the gums and throat were positive for fusiform bacilli and spirochaete. The bronchial sputum was positive for spirochaete, but negative for tubercle bacilli. Good results were obtained by treatment with Sodium Bismuth Thio Glycollate. He was given two doses. After a few weeks of rest the patient returned to work without symptoms and has continued so for the past several months.

Case 6 male, age 26. His symptoms consisted of hemorrhage, slight cough and expectoration. The physical findings

were sonorous and sibilant rales over the entire lung field. The x ray showed heavy linear markings throughout both lungs. The hilus region was much denser than in the normal individual of his age. Laboratory findings were positive for fusiform bacilli and spirochaeta from the bronchial sputum and smears from the gums and throat. Four doses of Sodium Bismuth Thio Glycollate were given him with good results. This patient continued to work and improved markedly with postural drainage and bismuth treatment.

Case 7 male age 38. This patient was suffering from back ache, fatigue, shortness of breath and cough. His sputum was mucopurulent and blood streaked. A few scattered coarse rales were found over the lung field and were more marked in the bases of the lungs. In the x ray, both lungs showed a marked increase in hilus and linear markings. Bronchial sputum, gum and throat smears showed positive for fusiform bacilli and spirochaete. Sodium Bismuth Thio Glycollate was given intramuscularly weekly for six weeks and the necessary dental work was done as well as the tonsils removed, giving good results.

Case 8 female, age 45. This case had symptoms of profuse hemorrhage, cough and expectoration, loss of weight, extreme nervousness, and low grade afternoon temperature. The physical findings were sonorous and sibilant rales over the lower half of the right lung, also diminished resonance over this area. The left lung was apparently normal. The x ray showed that the right lung had irregular bronchial markings and a questionable multiple abscess in the mid portion of the lower third. It also showed that the left lung was apparently normal. Due possibly to recent dental work, the mouth was found negative for fusiform bacilli. The throat smear showed positive for fusiform bacilli and spirochaete. The bronchial sputum was likewise positive for fusiform bacilli and spirochaete. The treatment administered was postural drainage and Neo Arsphenamin given intravenously, 2 for four doses. This gave excellent results.

Case 9 male age 20. Hemorrhage, fatigue, nervousness, slight loss of weight, and low grade temperature were the symptoms given in this case. The x ray showed increased linear markings throughout both lungs. The gums, throat, and bronchial sputum showed positive for fusiform bacilli, but were negative for tubercle bacilli. We advised arsenical medication but the patient failed to return for treatment.

Case 10 young man, age 23. The patient complained of slight cough, marked fatigue, sore throat, hemorrhage, and very foul breath. His tonsils and throat were badly inflamed. The x ray revealed marked increase of linear markings throughout both lungs and more marked in the hilus region. The gums, throat and bronchial sputum were positive for fusiform bacilli and spirochaete. The sputum was negative for tubercle bacilli. Results were very good from Sodium Bismuth Thio Glycollate treatment given intramuscularly weekly for six weeks. After the bismuth injections the tonsils were removed and the throat healed readily.

Case 11 male, age 18. The symptoms in this case were hemorrhage, extreme nervousness, fatigue and foul breath. A few scattered rales were found throughout both lungs. An x ray showed marked increase of linear markings throughout both lungs. The laboratory findings for the throat and bronchial sputum were positive for fusiform bacilli and spirochaete but negative for tubercle bacilli. This case was referred to the family doctor and Sodium Bismuth Thio Glycollate treatment was advised.

Case 12 male, age 24. His symptoms were slight temperature, profuse hemorrhage, marked fatigue, extreme nervousness, and cough. The physical findings were coarse rales throughout both lungs, more marked in the lower portions, otherwise apparently normal. In the right lung marked increased densities through the hilus and intermediate portion were shown in the x ray. Increased linear markings with two definitely calcified tubercles in the hilus region appeared.

in the left lung The gums, throat, and bronchial sputum were found positive for fusiform bacilli and spirochaete The sputum was negative for tubercle bacilli Sodium Bismuth Thio Glycollate was given intramuscularly weekly for six doses, producing splendid results This patient continued to work during the treatment

Case 13 male, age 60 This case noticed a rusty sputum for several weeks before reporting for examination His physical findings were sibilent and sonorous rales over both lung fields The x-ray showed marked increased linear shadows throughout both lungs, with some irregular shadows indicating some dilatation of the bronchi Throat and bronchial sputum were positive for fusiform bacilli and spirochaete The sputum was negative for tuberculosis Neo Arisphenamin treatment, 3 gram for six doses, one each week, was given, producing good results

Case 14 male, age 48 Symptoms for this case were hemorrhage, nervousness, and fatigue, also low grade temperature in the afternoon The physical findings were sonorous and sibilent rales over the greater portion of both lungs Inspection of the x-ray showed scattered calcified lesions throughout the lower two thirds of both lungs, varying in size from one half to two cm in diameter There were also irregular markings throughout the entire two-thirds of the lungs The throat and bronchial sputum were found positive for fusiform bacilli and spirochaete The sputum was negative for tubercle bacilli Good results were obtained from arsenicals, given intravenously

Hemorrhagic Bronchitis is a condition which is contagious and is definitely in-

creasing in America, or the condition has been misdiagnosed heretofore The diagnosis is relatively simple by a careful microscopical study of the bronchial sputum with observation and x-ray Special precautions should be observed in the collection of the specimens because similar organisms are normally found on the teeth, at the gum line, and in the crypts of the tonsils Preliminary use of the toothbrush, mouth washes and gargles are of vital importance Bronchial spirochaete rapidly disappear from sputum so that the specimen should be examined within one-half hour after it is coughed up

It must be borne in mind that a spirochaete infection may complicate pulmonary tuberculosis or other lung conditions It responds very readily to the proper treatment which should be oral hygiene directed by a competent dentist, clearing up the foci of infection in the throat by a nose and throat man, postural drainage and some form of bismuth or arsenical treatment, together with general hygienic and dietetic measures to increase the patient's resistance

The seriousness of this condition lies in the fact that it resembles tuberculosis so closely The distinction between these two conditions cannot be made too carefully If a case of pulmonary tuberculosis is treated with arsenicals and bismuth some harm can be done At the same time, if a case of hemorrhagic bronchitis is treated on ordinary lines of pulmonary tuberculosis very little result can be expected One may be advised to make radical changes in the mode of living at great expense and discomfort when treatment can be effected by the physician who makes the proper diagnosis

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The Treatment of the First Six Months of Pulmonary Tuberculosis

NO DOUBT you have noticed that I have been assigned the difficult task of discussing "The Treatment of the First Six Months of Pulmonary Tuberculosis"

In order to bring the subject within the scope of my experience, I shall take the liberty of discussing "The First Six Months' Treatment of Pulmonary Tuberculosis"

A few decades ago, the treatment was relatively simple. The family physician understood that an early diagnosis was important, but early or late, he was comforted by the fact that the treatment remained the same. Today, the family physician who makes a diagnosis of pulmonary tuberculosis faces a most difficult task. He is immediately confronted with the grave responsibility of determining whether the case is minimal, moderately advanced, or advanced, whether it is acute or chronic, whether predominantly unilateral or bilateral. He must also recognize the presence or absence of cavities and, if cavities are present, he must determine their size and location, the character of their walls, and the condition of the surrounding tissues. He must consider the pleura, and, if possible, determine the presence or absence of adhesions, he must ascertain the position and mobility of the diaphragm and the mediastinal structures, he must attempt at least a clinical estimate of the vital capacity of the lungs, he must appraise the cardiovascular system, with particular reference to the integrity of the heart muscle, he must recognize serious complications when present, as well as other associated pathological conditions.

These demands require unusual knowledge of the anatomy and physiology of

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the intrathoracic organs, an appreciation of the pathology of tubercle from early proliferation to cavity formation,

special skill in physical diagnosis, plus the wisdom of clinical experience, also fluoroscopic service and good stereoscopic x-ray films. Other laboratory facilities and occasionally additional highly technical procedures are necessary in certain cases.

There must be a choice between home treatment and institutional treatment. In those chosen for institutional treatment, there must be a choice between routine management and surgical collapse, in those chosen for surgical collapse there must be a choice between artificial pneumothorax, intrapleural and extrapleural pneumolysis, phrenic-nerve interruption or intercostal neurectomy and thoracoplasty. Often there must be a decision with reference to simultaneous bilateral or successive bilateral pneumothorax, also with reference to cautious combinations of the various surgical procedures mentioned above.

It is obvious that modern advances in the treatment of pulmonary tuberculosis have brought a multiplicity of problems. It is equally obvious that the family physician working alone cannot adequately meet all the above requirements. Even those who specialize in diseases of the chest must resort to team work in order to accomplish the best results. It is unfair to both physician and patient to leave the management of pulmonary tuberculosis wholly in the hands of the family physician.

While there has been no change in our opinion with reference to the efficacy of the fundamental principles of treatment, rest, dietetic and hygienic, and while in certain cases these principles can still be successfully applied in the home environ-

*Paper given at the Get-Together Luncheon of The Federation of American Sanatorium Association, Kansas City, May 12, 1936.

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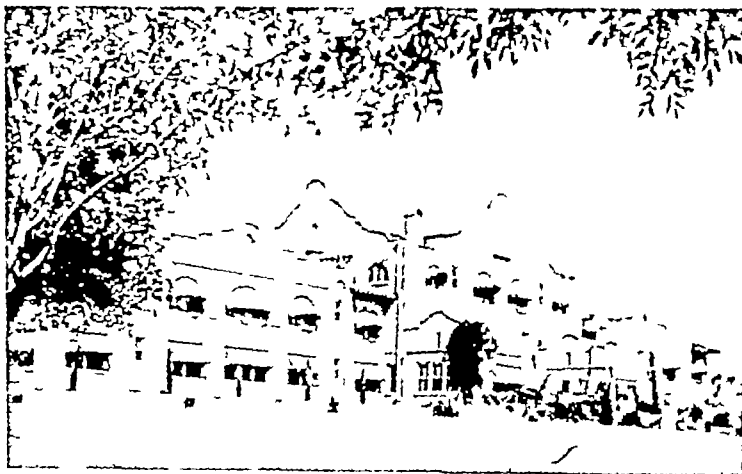
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ment, modern therapeutic advances, which have proved such a boon to those suffering from advanced tuberculosis, require the equipment and facilities of the sanatorium and the hospital. The minimal and moderately advanced cases not responding to routine management, and all advanced cases, require special diagnostic consideration in order to determine appropriate therapeutic measures. With rare exceptions, such diagnostic studies cannot be successfully pursued in rural communities. Neither is it possible to apply the respective modern therapeutic measures outside of the well ordered institution.

The above discussion makes obvious the fact that the difficulties are not only professional, but environmental as well.

If these difficulties are not overcome, many of those suffering from tuberculosis will be denied the opportunities for recovery and many, who are not yet obviously tuberculous, will be unnecessarily exposed to infection.

In closing may I say the first six months' treatment, like that of the last six months', is dependent upon an intelligent diagnostic survey of the case with a view of carefully applying the varied modern therapeutic measures in such a way as to meet each patient's individual needs. The advantageous application of ever-increasing knowledge in the field of pulmonary therapy demands intensive cooperative professional efforts, with increasing emphasis upon the patient's individual needs.

COMPRESSION THERAPY IN FAR ADVANCED TUBERCULOSIS—(Continued from page 15)

was only half completed. The operation, since it has become one more radical in character, must of necessity be performed in more stages. The operation is more radical yet we are still operating on chronically ill patients and when ribs are removed in their entirety the number attacked in each phase of the operation should be less.

Just recently we have made a survey of 60 patients operated on by the more radical thoracoplasty and were rather surprised to find a rather large number of patent cavities. Only 78.43 per cent of patients operated on showed closure of cavities with negative sputa. A number of these patients operated on in recent months may be further benefitted by reoperation which will, of course, somewhat increase the number of cavity closures. To date no routine thoracoplastic operation will close all cavities and one has to reoperate, selecting one of the various reoperative procedures as best suits the individual patient.

In conclusion we wish to state that we believe we have shown you a sufficient number of x-ray film series to definitely establish the value of bilateral pneumothorax in far advanced bilateral tubercu-

losis. The films of the patients who have completed their therapy, show pulmonary reexpansion and checked by subsequent films should be rather interesting.

We have the present series of films on a rather large number of patients operated on by thoracoplasty in the presence of contralateral pneumothorax and a goodly number of these patients have had their therapy completed. It is believed that if you consider the initial x-ray film on many of these patients their prognosis as to recovery seems hopeless, yet by radical methods applied cautiously, disease arrest was obtained.

We have used thoracoplasty almost entirely for lung collapse where more conservative collapse therapy has failed. There has been a trend of conservatism throughout our discussion yet we have shown you x-ray films demonstrating collapse therapy in its most radical form, but we believe you will agree that what has been done in each patient was necessary to obtain adequate collapse. Adequate collapse should be gained in all patients utilizing the simplest and most conservative therapy to effect that collapse.

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ABSTRACT

SCHWALM, ERICH Experiences with the Gerson Diet in Pulmonary Tuberculosis *Klin Wochschr*, p 1941

In the German daily press there have appeared statements that by means of the Gerson diet the severest cases of pulmonary tuberculosis have not only greatly improved, but have been practically cured. On the other hand, in the scientific tuberculosis literature there has been only unfavorable mention of the method and its results. Schwalm put 20 cases of pulmonary tuberculosis on the Gerson diet in connection with mineralogen and phosphorus cod-liver oil. In some of the cases the use of cod-liver oil was omitted in order to try out more conclusively the effects of the Gerson diet and the mineralogen. As a substitute for the phosphorus, cod-liver oil recresal was given. In spite of the fact that there was no difficulty in making the

diet palatable, in the majority of the patients there arose sooner or later a disinclination, or even a pronounced aversion, to the salt free diet. Schwalm regards this as a point of some importance in relation to the use of such a diet for tuberculous patients who frequently suffer from loss of appetite. The mineralogen was always unwillingly taken. From his experience with these 20 cases, the author draws the following conclusions. In no one of the twenty cases of pulmonary tuberculosis treated by the Gerson diet was any improvement of the pulmonary condition noted. No objective change could be observed in these patients that could be interpreted in the sense of a detoxication or alteration in tone. The weight increase fell within the same limits as occurs ordinarily under sanatorium treatment. For

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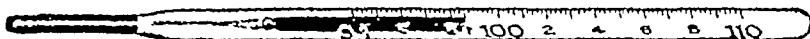
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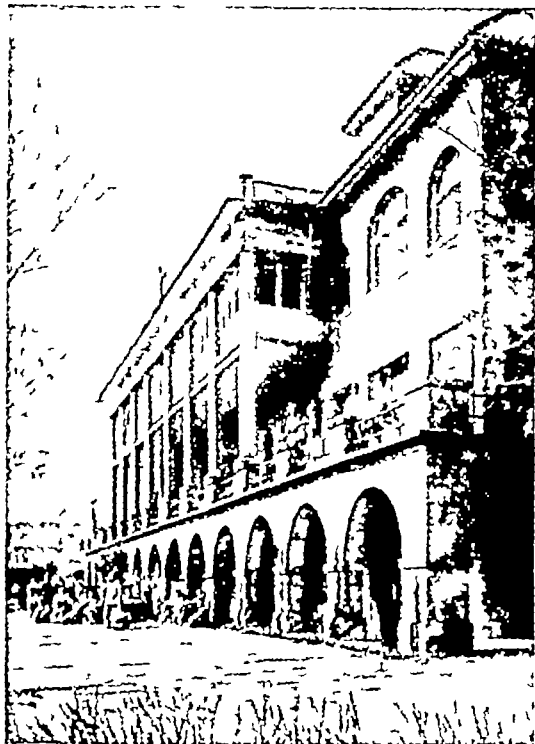
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the increase in weight, the phosphorus and liver oil appeared to be of the greatest moment, a fact already known in tuberculosis therapy. No advantage on the part of the Gerson diet could be shown over the usual diet of the German Sanatoria in which the vitamins also play a part. The author closes with the wise remark that in

case of a more extensive trial of the Gerson diet, such should be placed in the hands of experienced tuberculosis therapeutists, who through their many years' experience in the management of large sanatoria are fitted to make accurate observation and judgment of the results of such treatment.



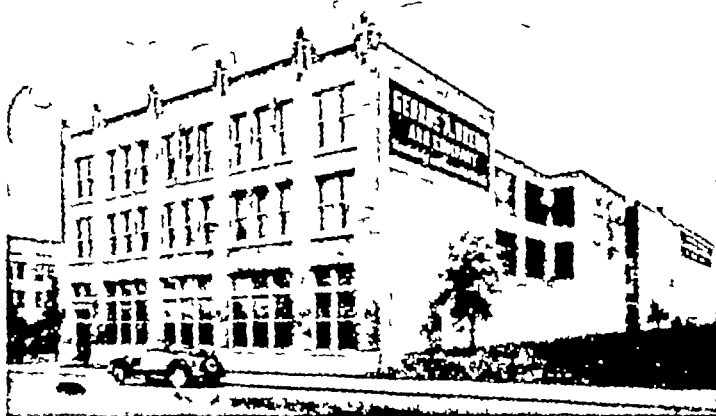
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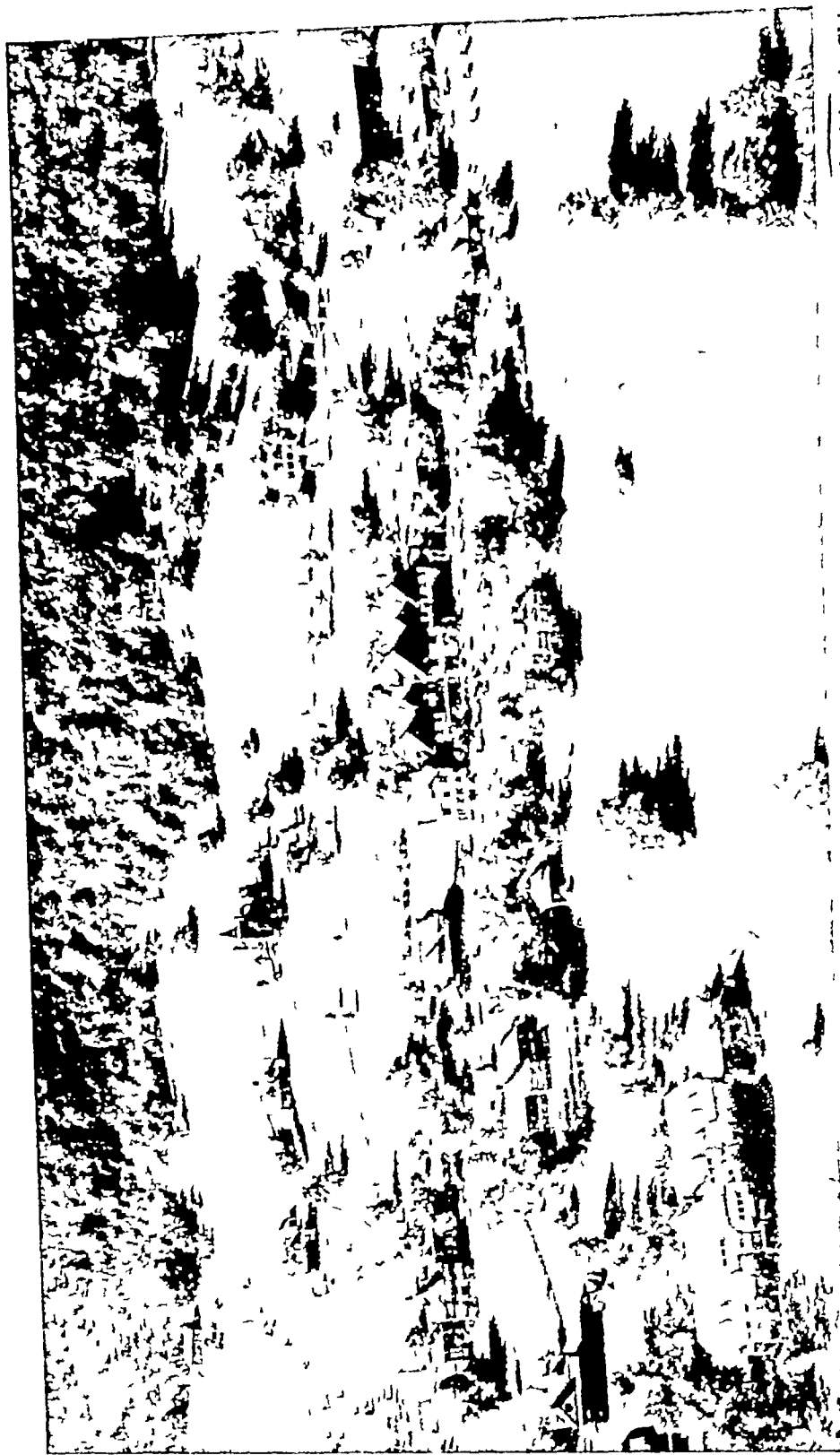
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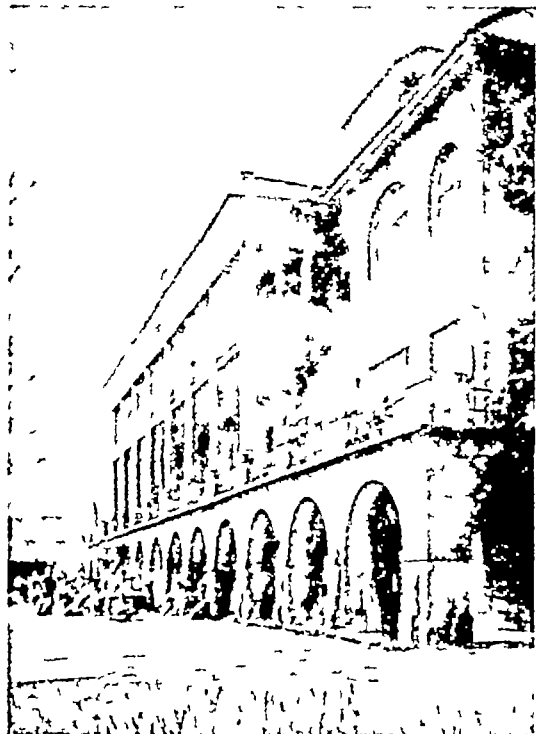
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COMMITTEE ON ECONOMICS

Federation of American Sanatoria

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*The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind*

*Laurason Brown, M D*

## Editorial Comment

**To Our New Readers** THIS ISSUE of the DISEASES OF THE CHEST publication

will come to many readers for the first time. The journal is now nearing completion of its second year in the field of medical sciences. It is the aim and purpose of the editorial staff of DISEASES OF THE CHEST to bring to the busy physician short, concise articles on chest diseases written by specialists with long training in this branch of medicine.

The editorial policy of DISEASES OF THE CHEST is, *first*, the early diagnosis of chest diseases and, *second*, segregation of the open case of tuberculosis.

*Our Motto "CLOSE THAT CAVITY"*

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M K

**New Trends in Prevention** IN RECENT years there has been a marked change of opinion as to the manner of infection and development of the disease which naturally influences our ideas of prevention. We do not have to go back far in literature to find many excellent clinicians contending that pulmonary tuberculosis depended upon childhood infection, usually taken by mouth, and that this later developed into active disease. The present trend of thought is

well expressed by Levine, writing on childhood tuberculosis, when he states that in the vast majority of cases the organism enters the body by inhalation. Laurason Brown further crystallizes modern thought when he says, "The view is gathering strength that in most all instances pulmonary tuberculosis is due to exogenous infection." Habbe, makes the interesting statement, "that those who on roentgenologic study shows normal lungs at 25 years of age or later are not apt to develop clinical pulmonary tuberculosis later." Landis, sums up the present when he states, "examine all contacts and trace the source of infection." C M H

**Cigarettes and Tuberculosis** THE USE OF CIGARETTES by tuberculous patients is the subject for dog-

matic opinion on the part of physicians and sanatorium heads rather than for scientific discussion or painstaking clinical observation. The physicians opposed to smoking and favorable to it are often equally positive. In the main, however, medical men familiar with the treatment of the tuberculous will agree that cigarette smoking, with almost invariable inhaling, can do no good to the diseased lung and in many cases increases cough and is otherwise distinctly detrimental. Many physi-

cians decline to become the guardians of their adult patients. They give advice and leave it to the intelligence of the patient to carry out that advice. Some sanatorium heads declare that in dealing with grown persons, those determined to smoke will do so surreptitiously if they are not permitted to smoke openly and consequently the practice is tolerated in certain parts of the institution. Other institutions will not tolerate smoking under any circumstances and contend that if the patient is not capable of exercising the degree of self discipline necessary in giving up cigarettes, his chances of recovery are not especially bright. Other patients must not be disturbed and possibly injured by the lack of self control of the individual.

It is observed among presumably healthy individuals that, in spite of the comforting slogan "not a cough in a car load" there are often many coughs in a carton. In these individuals, cough and scattered rales will often disappear merely by stopping smoking. It is to be reasonably presumed that, if this is true, the inhalation of tobacco smoke must be generally irritating to the diseased lung. Certainly, in a serious matter like tuberculosis, it is better to deal with smoking as Mr. Punch dealt with matrimony when he advised "in case of doubt, don't."

What is said of men patients in this particular is especially true of women. In an experience of a quarter of a century of sanatorium management, the writer can recall few if any men, however long they had smoked, who did not give up the habit without serious discussion when told firmly that they could choose between their smoking and leaving the sanatorium. On the other hand, several women patients have expressed themselves as totally incapable of giving up cigarettes and have left the sanatorium on that account. In a follow up of these patients, most of them turned out badly. Whether these bad results were due to continued smoking or to general lack of intelligence and self control, it is, of course, impossible to say.

G T P

**Tuberculophobia** ONE OF THE back-washes of the intensive anti-tuberculosis campaigns waged in this country during the past thirty-five years, has been the development among many of our countrymen and women of an undue fear of the disease Tuberculosis. At times this unreasoning fear becomes actually grotesque. I have known people to say that they would not spend the *night* in a resort for the tuberculous for fear of tuberculosis! They were not afraid to spend the *day* there, presumably the "miasma" of the night air would prove noxious. But why be afraid of the night air? As Woods Hutchinson wrote many years ago "It's the only air we have at night."

In all seriousness, this question of tuberculophobia is a very living, practical thing. Like all ungrounded fears, it is based on prejudice and ignorance, upon a state of mind rather than a state of facts.

Tuberculosis is *not* a contagious disease in the sense that measles and scarlet fever are contagious diseases. It is a communicable disease and its incidence of communicability is in direct proportion to lack of hygienic living. Those of us who have practiced medicine for some time can well remember the sinister diagrams of "lung block" under the Manhattan terminus of the Brooklyn Bridge—frightful tenements, where from certain notorious rooms and "apartments" there originated in rapid succession case after case of tuberculosis. We can still see those rooms marked in black squares on diagrams truthfully drawn and shudder as we gaze.

Are these, however, typical of the communicability of tuberculosis the country over? Thank God, No! As a matter of fact, save in the case of the "submerged tenth" of our society, tuberculosis is not an easy disease to acquire from person to person. Children living in a family where there is present an open case will, it is true, often develop tuberculous infection as disclosed by a positive tuberculin test, but tuberculous *infection* is

vastly, different from tuberculous disease, and the very development of a tuberculous infection as a result of repeated minimal doses of tubercle bacilli seems to build up an immunity in the sensitized organisms, in the vast majority of cases tuberculous disease does not follow.

Instances of "conjugal tuberculosis, namely, the development of the disease in the second member of a couple, one of whom is definitely ill with the disease, is of surprising rarity in all but the lowest classes of society. Were tuberculosis contagious, or even as communicable as some would have us believe, it would seem that hardly any could escape. As a matter of fact, a few simple precautions in the family harboring an open case, will definitely limit the possibility of the spread of infection to other members of that family. These are

- 1 Use of tissue paper to cover the mouth when coughing
- 2 Use of sputum cup for sputum
- 3 Use of separate dishes, glasses and flat silver
- 4 Use of paper napkins
- 5 Separate washing of bed linens and towels
- 6 Keeping small children away from patient himself (it is perfectly safe for them to come into the room)

All these, save possibly the last, are easily brought about.

Furthermore, it is a well known fact that employees working in sanatoria for the tuberculous contract the disease with the greatest rarity. When it is considered that these people are usually from the lower walks of life and that they are brought into contact with those utensils and belongings that are most intimately connected with the patient, the relatively slow communicability of tuberculosis must be evident. This is particularly striking in the South, where the vast majority of the employees in sanatoria for the tuberculous are colored, members of a race whose susceptibility to tuberculosis is known to be particularly marked and in addition, more ignorant and more lacking in proper hygienic training than

then white brethren.

There is no reason for the panicky fear of tuberculosis. Almost anyone will unquestioningly and fearlessly spend the night in my metropolitan hotel without a thought as to who or what the previous occupant may have been. Practically everybody will go to bed on a Pullman, having no care as to who may have occupied that berth or compartment or drawing room on the car's previous run, and yet it may have been a tuberculous case expectorating billions of bacilli and, because of a common carrier, deliberately careless and careless. "What you don't know don't hurt you."

I am fully cognizant of the sources of infection in tuberculosis and of their mode of spread. I am fully aware that the disease can be carried from one person to another by prolonged intimate, unhygienic contact, but I am also convinced that in the vast majority of instances, among all but the lowest castes of society, this phobia concerning tuberculosis is all wrong and should be combated energetically. What we physicians seek to present is the truth. We do not want to soft-soap society, neither do we want to stampede humanity into the belief that a curse is among us that will spread its death-dealing arms broadcast irrespective of anything we can do. We do not want to countenance the idea that a resort for tuberculosis is a plague spot, one to be avoided by the healthy at all costs. We wish to manifest a solemn respect for the tubercle bacillus and for its possible ravages, we wish, at the same time to insist upon the fact that granted its known presence, simple precautions will take care of every germ coming from the human body, and that the careful and conscientious and well-instructed patient will himself eliminate his harmful potentialities, leaving the almost ubiquitous tubercle bacillus uncontrolled and uncared for, together with the enormously Protean causes of lowered resistance in men, women and children, as the main agencies in the continued existence of this disease.

P. H. R.



# The Consideration of Patients For Thoracoplasty

TEN YEARS of thoracoplasty have passed For the benefit of the future of this procedure it is

high time that you, as medical men caring for patients both before and after thoracoplasty, and we, as thoracic surgeons, consider very critically and impartially the end results that we have obtained so that, by this consideration, we can, not only more correctly tell a patient contemplating it what he may reasonably expect following operation, but also in those cases not rendered well, find, perhaps, additional factors that may more nearly solve the problem of health restitution

Ten years ago, doctors were hesitant to consider, more hesitant to advise, and very hesitant to try thoracoplasty It was an experiment to the phthisiologist, a new field to the surgeon, a last desperate chance to the patient

The physician said to his surgeon, "I have a patient who has been ill with pulmonary tuberculosis for years He is surely going to die unless something is done I have tried all minor therapies, thoracoplasty is his only chance"

The tuberculous history of the patient, his resistance to disease, the actual character of the pulmonary lesions were not particularly considered It is not remarkable that the early results were discouraging enough An appalling percentage died Of those who survived, few were actually benefited materially

1 Short sections of ribs only were removed

2 Far more was done at each operation than the patient could safely stand

3 Little was known of the proper post operative care

4 Soft advancing bilateral involvement with little or no evidence of fibrous tissue reaction to the infection was present

BY

FRANK STEPHEN DOLLEY, M.D.

Los Angeles California

ent more often than not

So then, in these early thoracoplastic days it was entirely logical and correct

that prospective victims should react violently against this procedure Scores of tuberculous patients left the various sanatoria in panic when it was mentioned to them "The rib operation" was a thing of horror in those days

The years have passed In a properly conducted sanatorium where cases are properly selected and the various less radical measures which often are successful are given proper consideration the death rate is so low and the improvement in the patients is so high that the others, long sick, convinced of the seriousness of their pulmonary situations, accept the thoracoplastic decision with relief The ones at present who usually agree to thoracoplasty

1 Have been sick and incapacitated for years

2 Are desperately anxious to find some short cut back to their families or business

3 Suddenly realize with apprehension that the months and years of rest find them more seriously ill than when their so called cure began

When these chronic tuberculous patients look ahead along the road that they must follow, the converging lines exclude all else but thoracoplasty Try as they may this last procedure cannot be excluded Their impatience, their long continued limited activity, their worry over home and financial conditions, and their panic and fear of continued advance in their disease make the decision for them

Let us, for a moment, leave the chronic tuberculous who have given their consent In the last few months a few of us have had the temerity to forecast the treat-

\*Read at the meeting of Federation of American Sanatoria Kansas City Missouri May 12 1936

ment of acute pulmonary tuberculosis about as follows

1 The general early recognition of pulmonary involvement

2 Immediate isolation and bed rest

3 Consideration and decision within the first few weeks as to whether or not sufficient improvement is taking place in the patients to warrant assuming that continued rest alone will be sufficient to produce a cure. If not, then immediate consideration of therapeutic pneumothorax temporary paralysis of the diaphragm, upper intercostal nerve crushing as potential aids to achieve or hasten healing

4 If successful pneumothorax is prevented by adhesions to the chest wall, the adhesions are divided if it is practical and reasonably safe. If pneumonolysis is not feasible and if the pneumothorax is not definitely leading to arrest of the pulmonary lesions it is to be at once discontinued since an unsuccessful pneumothorax has the minimal possibility of relief and the maximal one for disastrous complications

5 If, then, pneumothorax has been found impossible or unsuccessful then paralysis of the diaphragm can be attempted. Often this should be tried before pneumothorax. Division of the intercostal nerves from the second to the sixth or eighth by paralyzing the intercostal muscles may so reduce the mobility of that side of the chest that steady continued improvement is evident

Now, in the consideration of all these things and the application of those that seem likely to benefit the patient only a few months need pass before it becomes evident that progress toward recovery has ceased. Then, a collapse of the involved tuberculous tissue by multiple rib resection should be considered. In other words, the time seems not far distant when a patient coming under the care of a man experienced in treating pulmonary tuberculosis will be constantly watched with the idea that if improvement is not continuous something must be done at once to make it so. Each pro-

cedure in the order of its conservatism is given its chance. Following each, if good is to come from its application, evidence of this improvement should appear in a few weeks. So that in the end, by the time a patient has been a year more or less under a doctor's care it is perfectly possible that such a patient could be promptly cured by the type of thoracoplasty peculiarly fitted for him. Pulmonary tuberculosis might well then be changed from a chronic disease to a comparatively acute one.

The author has been one of the earliest and one of the most enthusiastic advocates of this course and still is. Yet there are two very definite reasons at present why this program cannot be carried through to comparatively early thoracoplastic success.

1 The patient himself usually is not convinced after a year or even two years that he will not recover without thoracoplasty.

2 By no means all our cures following thoracoplasty are really cures and the consideration of this last sentence is the purpose of this paper.

It is the author's opinion that actually there is a small percentage of people following an extensive seven or more rib thoracoplasty who become physically active and well again. Why?

1 In the great majority of cases there is persistent bronchiectasis with more or less constant absorption from the infected bronchi, the amount of this absorption depending upon the amount of physical exercise of the patient who harbors the bronchiectasis.

2 There are probably always tubercle bacilli quiet but still active enough to produce toxins which are absorbed according to the blood supply of the incarcinating scar tissue.

3 There is too often pain and discomfort in the back and side when the patient is up and about.

Combinations of these three factors in turn produce physical fatigue, shortness of breath on exertion, and mental depres-

sion Of them all, pain is often the most distressing

The operation has been a success. The sputum is negative and the patient is no longer socially ostracized. He can do a certain amount of work but his health has not been completely returned to him. Three things are preventing it. Pus, posture and pain. The purulent secretion in distorted and chronically infected bronchi, the abnormal relationship of vertebrae and ribs, and the pressure upon intercostal nerves. So then, we should not, indeed cannot, unreservedly say to these recently ill people, "Permit us to collapse your chest by thoracoplasty and you will be well." These recently ill patients conceive of recovery as return to their previous good health. This, at the present time, we cannot promise them. On the contrary, those who have been ill for many years desperately assent.

Following the present day type of thoracoplasty with sufficient post operative rest, eighty per cent or more have consistently negative sputum. They are stronger, can do more before fatigue develops, and are no longer dangerous social contacts. They are improved and they are glad that thoracoplasty was done. Yet, pain and shortness of breath and fatigue persist. Those who have gone through years of mental and physical distress find their present thoracoplastic discomfort bearable in contrast to their limitations before thoracoplasty, however.

So, in considering thoracoplasty for a patient, there are two things at present that we must do

- 1 Explain painstakingly to him what he may reasonably expect as his post operative result

- 2 Resort to every possible measure in the attempt to minimize his post operative bronchiectasis and pain and bony deformity

The prognosis a surgeon gives his patient should be made upon the results he himself is obtaining by thoracoplasty and not upon the statistics as given by others.

Pus posture and pain. It is the author's

firm conviction that the increasing percentage of relatively well people following thoracoplasty is in direct proportion to the success in minimizing these post operative conditions. The earlier the suppurative lung is collapsed the smaller will be the percentage of cases with permanently distorted and inflamed bronchi, the nearer the patient will return to complete restoration of health. For it is the fatigue from pus and pain that limits mental and physical activity.

The present day thoracoplasty is very briefly as follows. If the involvement is essentially in the upper lobe, there is complete removal of the first and second ribs, often with their cartilages, the complete or nearly complete removal of the third and very long sections of those ribs below, together with their transverse processes, so that actual obliteration of the cavity or cavities is accomplished, as shown by X Ray taken with sufficient penetration to burn through the overlying thickened pleura and soft tissue edema. The number and length of ribs and the time between stages depend upon the condition of the patient and the degree of motion of the released lung and pleura at the time the rib supports are removed. The application of chemical or heat to the rib beds to delay rib regeneration sufficiently long so that the previously decided upon collapse of the chest wall can be accomplished. This type of thoracoplasty properly conducted both as to surgery and post operative care leads almost uniformly to obliteration of cavities and to negative sputum. But the very extensiveness of the procedure that is successful in the above, increases the probability of bony deformity and pain and, therefore, of early fatigue and shortness of breath, of marked limitation when he returns to take up the position in business and society that he formerly occupied.

We are now removing close to the transverse process portions of all the intercostal nerves from the fourth to the eighth, inclusive and if we resect por

(Continued to page 26)

# Diagnosis of Pulmonary Tuberculosis

## By the Family Physician

THE LUNG specialist receives two main classes of tuberculosis patients. First, the early case, the early case is usually referred to him by the type of practitioner who makes a careful physical examination of the naked chest and has routine sputum analysis done on all cases that have cough and expectoration. The second group, consisting of advanced cases of tuberculosis, he usually receives from non professional sources. These cases come to him because some lay person suspects that they have tuberculosis. Frequently they give a history of having gone to physicians over a period of years. In the vast majority of cases their stories indicate that they never were carefully examined physically, nor their sputums tested, nor their chests x-rayed. In most instances, it is not a lack of ability to make a diagnosis on the part of the practitioner when he fails to make an early diagnosis, but it is due to his neglecting to examine the nude chest, to have an examination of the sputum made, and with the failure of these two agencies to reveal the cause of the patient's symptoms, to have the chest x-rayed.

Not only is this failure to make the necessary examination a matter of life and death to the tuberculous patient, but it is frequently a source of loss of reputation to the physician. The tuberculous patient acquires a considerable amount of information concerning his disease when he goes to sanatoria and sees there cases very much earlier than his, with very much better prospects of recovery and shorter stay in the sanatorium. His first question always is "Why didn't my doctor examine me and find out what was the matter with me long ago? I had the same fatigue, loss of weight, cough, and expectoration as these

BY  
FRANK WAITON BURGE, MD, FACP  
Philadelphia, Pa.

other patients and I recall feeling feverish in the afternoons. Why was I denied a physical examination, a sputum examination, a temperature reading and if necessary an x-ray, to show the real cause of my trouble?" This question cannot be answered by the specialist. It is unanswerable.

We know by the ratio of tuberculous patients to deaths from tuberculosis that there are a vast number of undiagnosed cases in this country. The family physician has the best opportunity of diagnosing these cases because the patient comes to him at the time of minor colds and routine sputum examinations alone will disclose a great many of these cases, the sputum being especially likely positive during acute respiratory infection.

It would not seem to be necessary to mention the fact that tuberculosis can not be diagnosed by physical examination when clothing is rubbing against the stethoscope. Every lung specialist however sees many patients who have never had a chest examination in spite of long months of doctoring.

The doctor that the tuberculous patient never forgives and never ceases to "knock," is the doctor who did not examine the patient's nude chest and have a sputum examination and a chest x-ray if indicated. It is almost always neglect of these fundamentals and not inability that causes the physician to lose his reputation in his community.

### Summary

#### The Three Fundamentals of Chest Diagnosis

- 1 Physical examination of the naked chest
- 2 Sputum examination for tubercle bacilli
- 3 X-ray

# The Management of Pulmonary Tuberculosis

THE IMPORTANCE of rest in the treatment of pulmonary tuberculosis cannot be exaggerated. Notwithstanding the

rapid strides made in surgical treatment in recent years, complete bed rest is still of fundamental importance. So much so, that it seems quite worth while to outline in detail a practical method for its application. One cannot avail himself of all the benefits of surgical treatment until it is combined with such adequate generalized rest as will be described.

The treatment of every active case of pulmonary tuberculosis should be begun by placing the patient at complete bed rest. This is true of every active case regardless of the extent of the lesion. Failure to recognize the necessity for drastic measures in the incipient or minimal case may allow progress to an advanced stage in a surprisingly short space of time. The institution of adequate rest requires that the patient be placed flat in bed. One or two pillows are permitted under the head but the shoulders should not be elevated by back rest or pillows. Most of the time is to be spent on the back with just enough turning on the sides to rest tired muscles and to assist in the production of sputum. The arms are kept close to the sides. Reaching is discouraged, as is the placing of the arms above or under the head. If extremely ill, the patient is fed by a nurse. When somewhat improved he learns to eat lying on one side from a tray. Bedpan and bed bath are insisted upon

BY  
GEORGE H. VERNON, M.D.  
Springfield, Illinois

quate, the nursing staff must be able to complete all routine nursing care outside these hours. Even the physician is required to respect this partition of time. Daily medical rounds are started early and concluded by ten o'clock. Only occasionally do monthly physical examination of the chest, x-ray and laboratory studies, or other special work intrude on the time of the individual patient.

These intervals from 10 until 12 a. m. and from 2 until 4 p. m. are called rest hours. The doors of the rooms are closed and the windows opened. The patient is to sleep if so disposed but otherwise, he is to refrain from talking, reading or listening to the radio. All lights are out by 9 p. m. and the same rules apply until morning temperatures are taken.

These measures bring the diseased lung tissues as nearly as possible to complete rest. They are continued until some time after the patient is temperature free. Something should be said about the method of determining temperatures. Thermometers are left in place beneath the tongue with the lips closed for a minimum of ten minutes. The hour following meals is avoided and patients are cautioned not to take hot or cold drinks before temperature time. Temperatures are taken at 7 a. m., 2 p. m., 4 p. m. and 7 p. m. When it is evident that the 7 p. m. temperature is always lower than the afternoon readings, in patients showing only moderate elevation of temperature, the evening reading is discontinued.

These precautions are necessary because of the great significance of slight elevations of temperature in pulmonary tuberculosis. Furthermore, an accurate temperature record is the most valuable single aid in directing the activities of the patient as recovery progresses. Only after the patient has been temperature

free for several weeks are any increases in physical latitude considered. These increases are referred to as privileges. They mean a great deal to the patient as tangible evidence of improvement.

Privileges are granted at regular weekly staff meetings. Here each case is reviewed and any special problems discussed. No patient's activities are increased at more frequent intervals than two weeks. In fact it is frequently necessary to wait three or four weeks before the next step can be taken. The patient is kept at complete rest until he is temperature free and has remained so for several weeks. Then if his condition is satisfactory in other respects he is permitted to sit up in bed for one meal daily. He is propped up with back rest or pillows and eats from a tray on a small bed table. Two weeks later, all signs being favorable, this is increased to two meals daily, so that at the end of six weeks the patient is sitting up in bed for all meals.

After another interval of two weeks or more the patient's condition remaining in every way satisfactory he is allowed to use a bedside commode once daily. This is increased again at intervals of at least two weeks to two, three, and full or unlimited commode privilege. This stage in recovery is therefore of two months duration or longer.

If this program seems overconservative, there are at least two very good arguments to be offered in its defense. Results have been progressively better as the regime of rest has been made more strict. Twenty years ago the sickest patients got out of bed on wind swept porches and walked inside to the bathroom. We are certain that it is more than an impression that there are fewer severe hemorrhages, fewer rapidly progressive cases and more favorable results under the present plan. In the second place, only very rarely is any individual patient able to progress from bed rest to normal activity without several back sets. These necessitate going back over at least part of the ground already covered.

The most common cause for the with-

drawal of privileges is recurrence of fever. One temperature reading of 99.1 returns the patient flat to bed for that day and until the situation is reviewed by the physician making rounds the following morning. He may at his discretion reinstate part or all of the patient's exercise. A temperature of 99.4 on two successive days returns the patient to complete rest until the next regular staff meeting. Blood streaked sputum or frank pulmonary hemorrhage, no obvious indications for absolute rest. Digestive disturbance with uncomfortable distention or diarrhea is common. Whether accompanied by elevation of temperature or not it is considered sufficient cause for at least temporary return to complete rest. So also is nervousness if present to an extreme degree.

When, however, the patient with full commode privilege is apparently ready for further activity he is permitted to go to the bathroom once daily. This involves a short walk and being on his feet for from five to fifteen minutes. Following this, the second, the third, and full or unlimited bathroom privilege are added in the same deliberate way. Finally tub bath is permitted. Time should be limited to five minutes in the tub and the water should not be too hot. The extremely fortunate patient might reach this stage on the road to recovery in six months after going to bed.

At this point something should be said about the regularity with which exercise is taken. The patient is required to utilize the authorized privileges each day unless there is elevation of temperature or pulmonary hemorrhage as mentioned. Temporary restriction of activity is subject to medical regulation in the same way as increased activity. This is sometimes necessary to combat the tendency of some patients to drift into a state of chronic invalidism which their condition does not warrant. Then too, there is an element of trial and error in the determination of an individual's exercise tolerance. Increases are made on the supposition that the patient is doing well on the ordered regime.

The next step in the progress of the patient who is doing satisfactorily on full bathroom privilege consists of sitting up in a chair. This is permitted in the following amounts, separated by the usual interval of two or more weeks: one half hour, two half hours, two hours, four hours, and full time up, exclusive of rest hours.

The patient is then gradually allowed to go to the dining room for meals over a period of from two to three months. First for one meal weekly, then three meals weekly, one daily, two daily and finally for all meals. Walking on level ground is the next addition. Starting with five or ten minutes this is built up slowly by five or ten minute increases.

The list of privileges which have been outlined fall naturally into six groups. These are bed meals, commode, bathroom, sitting up in chair, meals in dining room and walking on level ground. It is felt that the transition from one group to another entails a greater change than from one stage to another within the group. For this reason it is a frequent practice to allow a longer time between groups than between individual stages.

While rest is by long odds the most important factor in recovery from tuberculosis, there are many other features of treatment which are essential for satisfactory results. One of these is the absolute interdiction of smoking. We know of no scientific evidence of either harmful or beneficial effects of smoking on diseased pulmonary tissues. There may be some irritative action as evidenced by the fact that fine rales present in healthy smokers frequently clear up after a week's abstinence. At any rate it is our practice to advise against smoking for all time in tuberculous patients and to insist upon this restriction in the sanatorium.

Outside food brought in or sent in by well meaning friends or relatives is undesirable. The patient's appetite frequently is not good. A wholesome general diet is provided. Nourishment of any kind between meals is withheld if it interferes with the appetite at meal-time. Rich foods

and pastries eaten at odd times can completely defeat the cultivation of whole some dietary habits. Between meal nourishments consisting of various milk drinks are provided where they seem to make a desirable addition to the patient's total food intake. If outside food is utilized at all, it is best in the form of fresh fruits or candies in small amounts which are eaten immediately following the regular meals.

Probably as difficult to control as anything are the visits of friends and relatives. At home this is almost impossible. In the sanatorium visiting is restricted to the hours between two and five on Wednesday and Sunday afternoons. If a number of visitors are to be seen, not more than two should be in the room at the same time. In general the patients who come from a distance and have relatively few visitors at intervals of several weeks are more settled and progress more satisfactorily. One of the definite benefits of sanatorium care is the physical separation from all the responsibilities of home, business and social connections. Visits of friends and relatives almost invariably bring back these problems vividly. It is almost unbelievable how little judgment is exercised by visitors in shielding the patient from outside worries in many instances. That visitors are upsetting is shown conclusively by the fact that many patients show higher elevations of temperature on visiting days than at any other time.

Most of the discussion up to this point has treated of matters applicable to every case under treatment. This might leave the impression that there is little room for individualization in working with such patients. Nothing could be further from the facts. In no phase of practice is it more necessary to take cognizance of individual physical, intellectual and psychological capabilities.

The experience of having active pulmonary tuberculosis is a serious and time consuming one. It invariably interferes materially with the plans of the patient. The physician has not fulfilled his most

important office unless the months of convalescence are made a period of education and readjustment. It takes a great deal of strength of character to do the things that one must do to recover and remain well. The physician must be able to inspire confidence and respect if he is to be of any assistance in this aspect of the treatment.

No promises are made as to time. The patient is gradually introduced to the idea that it is impossible to know definitely how long it will take or how complete his ultimate recovery will be. This should not be done too early or too abruptly. It may be suggested gradually and indirectly and the intelligent patient learns it from observation and experience.

Tuberculosis takes away so much that the need for the substitution of new interests is obvious. In the very sick patients this is relatively unimportant and the concern of patient and physician alike are focused on the problem of getting well at all. However as the patient begins to be more comfortable physically an increasing amount of time must be given to this problem. At first the simpler forms of physical therapy are utilized under the guidance of a person interested in or especially trained in this type of work. Where the patient's window commands a view of sky, trees and shrubs it is sometimes pleasant to watch for and become acquainted with the bird population. This can be expanded by the use of a field glass and an illustrated book with descriptions of bird habits. Women have frequently a previously required interest and skill in needlework. Something of this type can usually be found which will not be harmful. An occasional patient finds stamp collecting an absorbing pastime. Basket weaving and leather work are suited to the later stages of convalescence. Cross word puzzles are valuable. They stimulate interest in the spelling and meaning of words. An enlarged vocabulary is built up and sometimes subjects for reading and investigation are suggested. Some discrimination in the selection of radio programs will enable the

patient to indulge or cultivate an appreciation of music. There are a number of other worthwhile interests which may be followed and guided to a greater or lesser degree in this way. If excitement or competitive feeling are aroused as in accounts of prize fights or baseball games definite harm may result. The responsibility for any undesirable effects of such activities rests on the physician and for this reason he should undertake their supervision.

The reading of worthwhile books offers the greatest possibilities for lasting returns to the patient. Where an appreciation of the pleasures of reading has not been acquired earlier every effort is made to introduce the patient to them. This is done by frequent conversational reference to the characters and situations of great books. Reference to one's own reading at the time may stimulate a similar interest in the patient. Some part of the weekly lectures is given over to a discussion of books. Other means of building up patient motive and development of adequate philosophy will be as varied as the cultural background and interest of the physician. Success will depend in a measure on the desire and mental capacity of the patient to accept and follow.

No discussion of the institutional care of the tuberculous would be complete without some consideration of the length of time the patient should remain in the sanatorium. This is very much a matter for individualization and depends on the home conditions, the financial background, and the psychological makeup of the patient. If progress toward quiescence is fairly regular and there is promise of relatively complete recovery, one would like to see the patient on two hours walking exercise before discharge. Some patients will never be able to advance this far. Where this is true and one seems to have reached the maximum of exercise which the patient can tolerate after repeated trials, two to three years will probably give all the aid possible in recovery. For adequate reason such as

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# Home Infection In Tuberculosis and How To Neutralize Its Dangers

AS THE RESULT of an enquiry carried out by my colleagues on the medical staff of the Welsh Nation

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al Memorial Association, it was possible for me to publish certain figures bearing on previous exposure to infection as a factor in the history of children found suffering from tuberculosis. The results, together with some figures relating to adult patients between fifteen and twenty-five years of age, are here reproduced as a basis for the remarks which I wish to make upon the importance of home infection in the production of the disease.

The figures as they stand in the table are striking, and appear to me to justify the view that exposure to contact with infected persons in the home during childhood is a very serious danger against which our best efforts should be directed. It is realized, however, that this opinion may be questioned on the ground that a group of non-tuberculous children, if

in a position to give statistics derived from Wales upon this latter point, but very interesting figures bearing on the question have recently been published by Dr Godias Diolet,<sup>1</sup> who shows that in his records at the Bellevue Hospital, New York, a history of exposure to tuberculous infection was as frequent amongst non-tuberculous patients as amongst those suffering from the disease. These figures, however, even if applicable to this country, which is open to doubt in view of the very different economic conditions prevailing in New York City, do not settle the question, as the mere absence of developed disease does not exclude infection. It may be, for instance, that many of the children classified as non-tuberculous are nevertheless destined to develop the disease in later life.

It appears to me that the Welsh figures given in the accompanying table must be

| Pulmonary Cases                                                  | Total Number Investigated | Total with History of Previous Contact | Percentage with History of Previous Contact |
|------------------------------------------------------------------|---------------------------|----------------------------------------|---------------------------------------------|
| Cases under fifteen years (Dr Watson)                            | 100                       | 65                                     | 65                                          |
| Cases under fifteen years (Cardiganshire Dr Charles Lloyd)       | 256                       | 185                                    | 72                                          |
| Cases under fifteen years (reported by other observers)          | 213                       | 134                                    | 62                                          |
| Cases fifteen to twenty-five years (females)                     | 344                       | 174                                    | 50                                          |
| Cases fifteen to twenty-five years (males)                       | 268                       | 75                                     | 40                                          |
| <b>Non-Pulmonary Cases</b>                                       |                           |                                        |                                             |
| Surgical tuberculosis (children)                                 | 166                       | 53                                     | 32                                          |
| Non-pulmonary cases in children (Cardiganshire Dr Charles Lloyd) | 202                       | 99                                     | 49                                          |

(In over 90 per cent of these cases the contact was in the home.)

then histories were carefully investigated, might afford an equally high proportion of individuals with a record of exposure to infection during early life. I am not

regarded as very significant. Out of 256 patients under fifteen years of age in Cardiganshire, no less than 72 per cent give a history of previous contact with infection, chiefly in the home, and out of a total of 569 children with pulmonary

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disease, 384, or 67 per cent, give a similar history. It is hardly within the bounds of possibility that such percentages are to be found amongst non tuberculous children of similar age groups, and the figures would appear to demonstrate that the infected home is an extremely dangerous factor in the production of the tuberculosis of childhood, adolescence and later life. If this conclusion be accepted, it is to the home that hygienic measures should especially be directed.

Many lines of effort more or less direct, suggest themselves. One is tempted, for instance, to advocate the removal of infected persons from their homes, but all those with experience know that such a course is often impossible in individual cases. Again, it may be suggested that children of tuberculous parents should be removed out of reach of contamination by the work of some such organization as the Granicher system, but here, again, practical difficulties usually step in to neutralize what has been found where applicable to be an extremely valuable line of prevention. Open air schools and convalescent camps or hospitals would doubtless be of enormous assistance, but no one can claim that these institutions exist in numbers sufficient to cope with the demand which would arise were such a measure generally applied in this country. In nearly every direction the good advice which we might wish to give appears to be very largely neutralized by practical difficulties of a serious kind. It is necessary, then, to consider what may be done to make the best of a bad situation.

We are up against difficulties of a formidable kind—housing difficulties, financial difficulties, difficulties incident to the natural love and affection of parents for their children, and the difficulties inseparable from ignorance, prejudice, and want. In spite of all these difficulties, much is being accomplished. Apart from the splendid achievements of tuberculosis physicians and other doctors, everyone acquainted with their work must acknowledge the value of the exertions of

the health visitors in the larger communities where these trained persons are available, and, again, the assistance rendered by after care committees is of incalculable value. There is one line of effort however which, though not forgotten by hygienists is still, I think, capable of considerable extension, and that is the intensive education of the tuberculous persons themselves as to the risk they constitute to their dependents and as to the measures which they should adopt to diminish it.

That it is possible for children to live in contact with infected parents and yet remain in good health is demonstrated not only by the researches of Dr. Godrus J. Diolet, already referred to, but in a highly interesting manner by the experience of such an organization as the Cambridgeshire Tuberculosis Colony at Papworth<sup>2</sup> where according to Dr. Varrier Jones, not a single case of tuberculosis has yet arisen amongst the children of the colonists living in the village attached to the institution. Here we have an example of what can be done by enlightened supervision and advice. The houses are of course, superior in many respects to those often occupied by the poorer classes in this country but, at the same time, they are by no means large, nor are the occupants either wealthier or better equipped than the members of comparative social groups living under ordinary industrial conditions. If it were not for the enlightened supervision of those in charge, the risks to children in a village settlement for the tuberculous would be greater than those that arise in ordinary village life. What we have to fight against is the intensive infection brought about by the thoughtless and uncontrolled contact of tuberculous parents and their children, augmented, perhaps, by poverty and want, which obliges the patients and the children to occupy the same sleeping apartment or even the same bed, aggravated as a rule by carelessness in the disposal of sputum and in the com-

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## Ambulatory Pneumothorax in Pulmonary Tuberculosis

IN RECENT years the use of collapse therapy in pulmonary tuberculosis

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has increased tremendously. The three chief methods of producing collapse are artificial pneumothorax, phrenic nerve operation, and thoracoplasty, and with this general increase in the use of these operations there have naturally occurred changes in our ideas and modification of our methods of treating our tuberculous patients.

While I was in charge of the Catawba Sanatorium, Virginia, 1909 to 1911, a few reports on the use of pneumothorax in pulmonary tuberculosis appeared in the literature, but we considered it too radical a procedure to use in a State Sanatorium. In 1913 when I started using pneumothorax at the Tuberculosis Hospital, D C, it was resorted to only in advanced cases which had been given bed rest treatment for a long period of time without improvement and the fact that we obtained a fair percentage of improvements and a few cures is a high tribute to this method of collapse therapy. We advised in those days that patients taking gas must still continue rest treatment in the sanatorium for a year or more.

At the present day many are advocating the immediate use of pneumothorax on every suitable case of pulmonary tuberculosis in which there is activity and a positive sputum. The ideal case is, of course, one in which the disease is unilateral, but we have found that many bilateral cases can be treated successfully.

In 1924, Davies I, said that no case of pulmonary tuberculosis which has been diagnosed with certainty is too early a one for treatment by artificial pneumothorax.

In 1932, Hawes and Stone II, advo-

cated the more frequent and earlier use of pneumothorax.

In 1933, Cedric Shaw III, after reporting the results in 267 cases advocated the use of pneumothorax in earlier cases.

In 1933, Lawlason Brown IV, predicted and advocated the earlier use of pneumothorax.

In 1934, V, I stated that it was my opinion that the artificial pneumothorax should be used immediately in all cases of early unilateral tuberculosis.

In 1935, Myers and Levine VI, strongly urged the use of pneumothorax in progressive minimal cases.

In 1935, Cole and Harper VII, recommended its immediate use in early cases.

These are only a few of the many who in recent years are urging earlier use of this method and are starting many of their cases earlier. This has resulted in a marked increase in our ambulatory pneumothorax patients, most of whom have had their treatment started in a sanatorium, have promptly become symptom free, maintained a negative sputum, and in a comparatively few months have returned to their homes and their daily work. There has been some fear expressed that the rapid curing of cases with artificial pneumothorax would markedly reduce the number of patients in public and private sanatoria, but I believe, equipped to use the various forms of collapse therapy, the sanatorium has much more to offer the patient than in the past and will benefit accordingly. The sanatorium will have a larger number of patients with a shorter length of treatment and the important factor from the health standpoint is that these ambulatory pneumothorax cases are almost invariably free of tubercle bacilli and hence are no menace to the public.

The marked increase in this type of patient is exemplified by my experience

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in Washington Ten years ago I averaged from ten to fifteen patients taking artificial pneumothorax, whereas it present I have approximately fifty patients taking this treatment and of this number all but seven are doing a normal day's work. This is also the experience of men doing chest work in the other large cities.

To emphasize the marked reduction in length of treatment when ambulatory pneumothorax is instituted, I will report briefly a few cases.

Case No I, Mr C McC, engineer, diagnosed pulmonary tuberculosis in June 1933 and entered sanatorium in July 1933. Examination showed tuberculous infiltration of upper lobe of left lung with cavity about 3 c c in diameter. Patient had daily fever and an artificial pneumothorax was started in July, 1933. When the patient returned to Washington in October, 1933, about three months after beginning treatment he was symptom free and had a negative sputum. He returned to work in December, 1933 and has continued working to date without any symptoms and no loss of time from work because of sickness. His pneumothorax is still being maintained.

Case number II, Mr D M D, manufacturing representative was diagnosed tuberculous in January, 1934. Examination showed dense tuberculous infiltration in upper lobe of right lung with cavity 4 c c in diameter. He had daily fever and positive sputum. I advised him to go to a sanatorium but he stated that he would lose his entire business if he had to be away over two months. I started pneumothorax treatment on February 1, 1934. He became symptom free in a few weeks and returned to work about March 28, 1934, less than two months after treatment was started. He has had no symptoms, his sputum is negative and he has not lost any time from his work due to sickness. His x-ray films show that his cavity has completely closed. He is still continuing pneumothorax.

Case number III, Miss E M B, bookkeeper, was diagnosed tuberculous June 3, 1932. Examination showed dense tu-

berculous infiltration in upper lobe of right lung. No cavity could be seen in x-ray, but patient had several severe hemorrhages. I started pneumothorax treatment at home June 5, 1932, because she refused sanatorium treatment. She returned to work in two months and has been perfectly well with negative sputum to date. Pneumothorax treatment was discontinued in February, 1934.

Case number IV, Miss M W, stenographer was diagnosed tuberculous October 29, 1932. Entered sanatorium January 1, 1933. Examination showed scattered soft infiltration throughout upper lobe of right lung and patient had several profuse pulmonary hemorrhages. Pneumothorax was started in February, 1933, she returned to her home the following October and has been working since with absolutely no symptoms and sputum negative.

We have had many other cases similar to these and I have felt that we were rather radical in allowing a number of these patients to return to work in two months, but recently Cole and Harper VIII, reported several cases returning to work in considerably less time than two months with no unfavorable results.

I wish to report briefly on ambulatory patients coming to the office for pneumothorax during the past six years. We have had a total of one hundred and four cases and the results have been as follows: seventy four apparently cured and arrested, thirteen unimproved and eleven dead. All of the seventy four cases classed as apparently cured and arrested are working or carrying on their normal activities. Of the thirteen classed as unimproved, most of them show promise of becoming arrested cases when sufficient time has elapsed to so class them. Of the total number of one hundred and four cases, seventy had their initial pneumothorax in sanatoria and thirty four were given their initial treatment by me, either in a rest home or in their own home. I find it is usually possible after the third or fourth treatment to get them into the

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# Nutrition and Tuberculosis

NUTRITION and tuberculosis are intimately interrelated. Nutrition plays an important role in the etiology, complications and therapy of tuberculosis.

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The word nutrition in its broad sense implies the character of the ingested food, the digestive processes that convert these foodstuffs into energy or building stones suitable for the particular needs of the body, the processes of assimilation, the degree of development of the body, and the elimination of waste materials.

In the first place, many writers believe that a faulty diet which results in a faulty state of nutrition is partly responsible for the development of tuberculosis. To be sure, tuberculosis is caused by the tubercle bacillus, but practically everyone is infected with the tubercle bacillus, yet most people do not develop the disease. What is there about those who develop the active disease, that has rendered them susceptible to the inroads of the disease? It is evident that it is not the virulence of the infection, but rather the lowered resistance that marks the beginning of the disease in adult life. Tuberculosis has been compared to a noxious weed lying latent in practically all human soils, finding its opportunity for growth in some bit of bad husbandry, some overstrain, some over fatigue, some dissipation, some neglect, or some lowered vitality through illness. The latent infection becomes a disease not by accident but by living and working under improper conditions or improper ways. Tuberculosis recruits many of its candidates from the undernourished, the underfed or stunted persons from the centers of congestion of urban communities. "The death rate from tuberculosis in England rises and falls with the price of bread," says Stewart.

Young people who are both underweight and undernourished are choice candidates for active tuberculosis. It has been shown by studies in vital statistics

that the mortality from tuberculosis in the early twenties increases one percent for every pound that the individual is

below the average weight for the height. Interestingly enough, although the general mortality from tuberculosis has steadily declined in the past decade nevertheless it has increased in the age group of adolescent and young women. The recent fad for reducing with its implied subsistence diets may be responsible for this paradoxical situation.

American diets as a whole are much better than they were a quarter of a century ago, due to the educational propaganda that has been carried on to make the public food conscious, particularly as to the vitamin and mineral content of the diet. It is true that much of this propaganda has been developed by commercial interests but in this case, they have served a useful purpose.

However the American dietary has not yet reached a stage of perfection. Sherman has recently pointed out that many American diets are deficient in calcium. An analysis of 224 presumably typical American diets showed about seven percent, or one in fourteen, to be deficient in calcium. He states that it is by no means safe to assume that a freely chosen diet would always furnish calcium in sufficient amounts to afford a safe margin above the actual requirement of normal nutrition, that the minimum requirement for calcium equilibrium is 0.45 grams daily, while 0.75 grams is a safe intake allowing for a liberal margin of safety. For practical purposes, this amount of calcium is contained in one quart of milk. This calcium deficiency in the American diet can well be considered in the analysis of the causes of tuberculosis.

Another instance of a deficiency in many American diets is brought out by the studies of Hanke who analyzed the

eating habits of several hundred children and found that the evidence indicated that many American diets are deficient in vitamin C and he states that this deficiency may be a factor in the etiology of certain diseases.

Nutrition of course is but one of the factors that enters into the predisposing etiology of tuberculosis. There are numerous other influences. In this paper we are considering the nutritional factor.

It has been sometimes argued that a normal person left to his own instincts will select the food suited to his needs. In other words, in health the appetite is a good guide to the quantity and quality of the food to be eaten. This may hold true in some cases, but it does not hold true in the multiplicity of cases where some pathologic condition exists in the body which disturbs the primitive instincts; hence in disease the appetite is no longer a reliable guide to the needs of the body, in fact it is often actually misleading. Thus in diabetes people develop voracious appetites, yet they are advised to eat a limited amount of food, whereas in tuberculosis the appetite may be lost, yet the patient is encouraged to eat more than he thinks he is able to handle properly. Furthermore, even in the case of the so-called normal individual, the force of economic pressure frequently determines his purchasing tendencies, and since the vitamin rich foods may occur in the more expensive groups of foodstuffs, these are apt to be overlooked where economic pressure is a determining factor.

In studying the nutritional needs of an individual it is highly desirable to have a yardstick to measure and pre-determine his physiologic needs. When these physiologic needs of an individual are properly supplied by adequate food, then such a diet may be designated as a normal diet.

There is no such thing as any general diet which is adequate for all persons of all ages, because the physiologic needs of even healthy persons change all through life, from birth to senescence, while in disease there are infinite special problems

that arise. The very physiologic processes of the body alter their rate of metabolism from decade to decade and this necessitates a constant readjustment of the diet. In addition, the factors of taste, habit, mode of food preparation, and custom add to the complexity of the problem.

But all diets have certain essentials, and experience has taught that there are at least eight such essentials in every diet. These eight essentials of nutrition are: 1, energy; 2, protein; 3, carbohydrate; 4, fat; 5, water; 6, salts; 7, roughage; and 8, vitamins. Any diet which does not include all of these eight essentials of nutrition is a deficiency diet. With eight potential variables, it becomes evident that a deficiency diet may assume many forms. Thus a diet becomes deficient if it is made up largely of corn and dried beans. The vitamins are obviously absent. Another diet contains the vitamins but is deficient in calcium, iron or iodine. The current fad for reducing has given rise to an interesting example of a deficiency diet. This diet is made up largely of solids, fruits, and meat. It contains an adequate amount of protein, vitamins, salts, roughage, but it is deficient in energy, thus compelling the body to destroy its own tissue to extract energy.

An adequate or normal diet for the average American adult weighing 150 pounds engaged in light work which will protect the individual from all known deficiency diseases should contain about 2800 calories of energy, 75 grams of protein, 125 grams of fat, 325 grams of carbohydrate, a liberal supply of all the vitamins including vitamins A, B (B<sup>1</sup>), C, D, E, G, (B<sup>2</sup>), about four grams of table salt, three quarters of a gram of calcium, one gram of phosphorus, 15 milligrams of iron, a liberal supply of roughage, and eight to ten glasses of fluid a day.

#### *The basic normal diet*

A sample 2800 Calorie Diet for the average American adult of 150 pounds that will adequately protect the general health

| Breakfast         | Household Measure | Grams or CC |
|-------------------|-------------------|-------------|
| Orange            | Average serving   | 200         |
| Oatmeal           | Average serving   | 125         |
| Cream (20%)       | 2 5 cup           | 100         |
| Sugar             | 1 tablespoon      | 20          |
| Whole wheat toast | 2 slices          | 60          |
| Butter            | 2 squares         | 15          |
| Coffee            | 1 cup             |             |

| Lunch        |                 |     |
|--------------|-----------------|-----|
| Tomato soup  | 3/5 cup         | 150 |
| Egg sandwich | Average serving | 90  |
| Perch salad  | Average serving | 200 |
| Milk         | 1 glass         | 180 |
| Wafers       | 6               | 20  |

| Dinner                |                 |     |
|-----------------------|-----------------|-----|
| Steak                 | Average serving | 150 |
| Potato (baked)        | 1 medium        | 200 |
| Green beans           | Average serving | 100 |
| Whole wheat bread     | 2 slices        | 60  |
| Butter                | 2 squares       | 15  |
| Fresh vegetable salad | Average serving | 200 |
| Sponge cake           | 1 slice         | 15  |
| Cream (20%)           | 1 ounce         | 30  |
| Sugar                 | 1 teaspoon      | 7   |
| Coffee                | 1 cup           |     |

This diet contains 2818 calories, 76 grams protein, 124 grams fat, 330 grams carbohydrate, 0.8 grams calcium, 2 grams phosphorus, 30 milligrams iron, and all six vitamins (From Gauss, Harry *An Adequate Diet for Dental Health, Nutrition and Dental Health*, 1935, 1, 5)

The above diet is to be considered a normal diet only for the average American adult of 150 pounds who is engaged in light work. The specifications for other normal diets vary greatly with the age, height weight of the individual and his work. The principal variations occur in two of the essentials. First, in the amount of required energy, and second in the protein fraction of the diet, or the quantitative arrangement of the foodstuffs.

The energy value of the diet varies from 700 calories in the first year of life to 4500 calories for the adult engaged in heavy manual labor. With advancing years and a withdrawal from the more arduous tasks of life the energy requirement usually diminishes.

Secondly, the protein requirement per kilo body weight is highest at birth and then diminishes until adult life is reached. This causes a marked alteration in the ratio of the foodstuffs in the diet from that of the infant to that of the adult. The protein requirement for the infant

is 2.5 grams per kilo body weight, whereas in adult life it is 1 gram. In infancy the ratio of carbohydrates to proteins to fats is 5 CH to 3 P to 4 F whereas that of the adult is 13 CH to 3 P to 5 F. Within the first year the ratio of the foodstuffs begins to change, and the change continues until the adult ratio is reached.

When a person contracts tuberculosis and especially if he is underweight, as so many of them are, he is told to eat more than he has previously. As stated the appetite is no guide. Too often it is lost in tuberculosis, which is unfortunate, since the patient not only needs as much food as in health, but more. He needs more food for two reasons. First he has a fever which causes him to burn up his energy faster than in health, secondly he has a destructive process going on in his body which he must seek to overcome by supplying ample repair material in the form of food. Against these reasons for additional food is the fact that the enforced idleness which is a part of the treatment reduces his energy expenditure. Nevertheless, the patient with tuberculosis at bed rest needs more food than the non tuberculous person under similar conditions. Hence arises the indication for a relatively high caloric diet in tuberculosis. However, in the attempt to build up the patient with tuberculosis there must be a plan, and not just stuffing, which can be equally dangerous. The desired goal is to make the patient attain his normal weight for his height and age. It is not desirable for him to gain weight in excess of his ideal age height weight ratio.

On admission to a hospital, the patient is put to bed and told to reduce his activity to the minimum, or he may be put at absolute rest. This of course is necessary in the treatment of tuberculosis, but it is not without its disadvantages, because the enforced idleness removes part of the normal stimulus to intestinal peristalsis. In the natural order of physiologic events, the intestines depend upon the general muscular activity for their stimulus to proper function. Now they be



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come deprived of this stimulus and tend to become sluggish and the patient develops constipation. Accordingly to compensate for the removal of the stimulus arising in the general muscular activity, the diet is planned to contain additional roughage as spinach, carrots, string beans, etc. These foodstuffs possess a triple virtue. They not only contain roughage but they are rich in vitamins and in the mineral salts, providing they are properly prepared. Unfortunately, a large group of patients come to tuberculosis hospitals who never acquired a taste for these foods and since most patients are given a reasonable privilege in the selection of their food, many of them omit these necessary and health restoring foods from their meals to their own detriment. Without doubt, a large number of the dyspepsias that are encountered in tuberculosis sanatoria result from the failure of the patients to eat a sufficiency of fruits and vegetables.

It is not within the scope of this paper to describe all of the special dietetic problems that occur as a result of the various complications of tuberculosis. However it is permissible to sound a word of caution with reference to certain highly advertised diets. There are no accredited trick diets in tuberculosis, neither are there necessarily any special virtues to diets labelled by imposing sounding titles. Fads and mysterious diets should be examined carefully and checked by standard principles of nutrition. An example of a highly publicized diet is the Hermannsdoerfer Sauerbruch diet for tuberculosis,

which has been credited with mysterious virtues. Upon analysis, we see that it has a fixed ratio of the foodstuffs, namely 1.5 grams protein to 2.7 grams fat to 4 grams carbohydrate. This ratio appears to be an essential characteristic of the diet yet it is without any scientific rational. Furthermore the diet imposes certain restrictions in the mode and preparation of the food, which seem arbitrary, empiric and unsupported by scientific logic. The chief virtue of this diet is to bring home to our attention the necessity for avoiding fads in the treatment of tuberculosis and to adhering to sound principles of nutrition and therapeutics.

#### *Summary*

- 1 Nutrition and tuberculosis are intimately interrelated.
- 2 A faulty state of nutrition is one of the predisposing causes of tuberculosis.
- 3 American diets need further study.
- 4 The normal diet is one which protects the individual from deficiency diseases and which supplies the physiologic needs of the body. It contains eight essentials, namely, energy, water, carbohydrate, protein, fat, salts, vitamins, and roughage.
- 5 A deficiency diet is any diet which contains less than the minimum requirement of each essential.
- 6 Sanatorium care of the tuberculous gives rise to special problems in nutrition.
- 7 There are no trick diets in tuberculosis. Mysterious sounding diets should be checked by standard principles of nutrition.

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## THE CONSIDERATION OF PATIENTS FOR THORACOPLASTY—(Continued from page 10)

tions of the ribs below this these lower nerves are crushed to get temporary paralysis since their permanent destruction often leads to distressing prominence of the abdominal muscles on that side This multiple intercostal neurectomy supplementing the thoracoplasty accomplishes two things It removes the possibility of pain on that side of the chest By paralyzing the intercostal muscles it minimizes the respiratory motion on that side Yet, often the pain has been in the back along the spine or even on the opposite side This we are convinced is due to incorrect posture We are anticipating this at present by the construction of a brace with its points of support on the crest of the ilium and axilla so that during the months following thoracoplasty the position of the thorax and the head and neck upon it are maintained in their proper relationship

We must recognize, then, that

1 Thoracoplasty does not cure nor stop rapidly advancing caseous pulmonary tuberculosis But,

2 That in essentially unilateral involvement where there is definite evidence of attempts at fibrous tissue limitation of the tuberculous process, arrest of the disease and negative sputum can be expected following the present day type of thoracoplasty in more than eighty per cent of the cases

These people with so called cures are improved, it is true They are able to leave their sanatoria, return to their homes, and resume work of a sedentary character However, they have not been

returned to health To a varying degree they are absorbing from chronic bronchiectatic areas within the collapsed lung Their postures are incorrect With or without exertion they have pain In consequence, they fatigue easily and, as the day advances, become more and more conscious of shortness of breath They are the victims of pus, posture and pain

By collapse of the chest wall comparatively early in pulmonary tuberculosis, by constant and intelligent attention immediately following thoracoplasty to the posture of the patient both before he is out of bed and by properly fitted braces afterward, by the division of the intercostal nerves close to the transverse processes the author is very confident that we shall change these so called cures with negative sputum but poor health into men and women who can resume to a very considerable extent moderate and sustained activity eight hours a day without fatigue, discomfort or mental depression When every physician who finds that the surgeon during his thoracoplastic work can be depended upon with his assistance to accomplish this in eighty per cent or more of his patients then, with our present knowledge of the great advantage of early thoracoplasty in pulmonary tuberculosis that has not responded to all less radical procedures, we can tell not only the patients ill with tuberculosis for many years, but those who have suffered only a comparatively few months that their chance of return to approximate health by this procedure is not only reasonably safe, but reasonably sure

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## THE MANAGEMENT OF PULMONARY TUBERCULOSIS—(Continued from page 15)

the question of contact in individual cases this may be extended indefinitely

In closing I should like to suggest the possibility of the use of this type of routine with appropriate modifications in a variety of diseases. Too frequently the directions given to patients regarding

exercise are so sketchy as to be of little help. It is of distinct value to have some definite series of steps in mind by which the patient will be returned to normal activity. The speed with which each increase is instituted will always be a matter of judgment and individualization.

## AMBULATORY PNEUMOTHORAX IN PULMONARY TUBERCULOSIS—(Continued from page 19)

office for fluoroscopic x-ray examination and office pneumothorax treatment. The percentage of arrestments, improvements and deaths were practically the same in my home group as in the sanatorium group, but I still advise every patient who can go to a sanatorium to go, for the first few months of his pneumothorax treatment in order to get the sanatorium training. In occasional instances such as case number II, where the entire financial future may be jeopardized, I believe we are justified in allowing a patient to return to work in from four to eight weeks, but I feel that the average case should take pneumothorax for quite a number of months before resuming work.

### Summary

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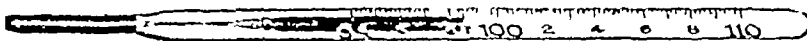
Every physician seeing a tuberculous case should consider the possibility of immediate pneumothorax treatment, either in a sanatorium or at home, as many early patients treated by this method can safely return to work in a few months.

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## HOME INFECTION IN TUBERCULOSIS AND HOW TO NEUTRALIZE ITS DANGERS—(Cont from page 17)

mon use of knives forks cups saucers etc without thorough cleaning

It seems to me that a still more intensive effort might be made to bring these points to the notice of persons leaving sanatoria or hospitals and of those infected patients with families attending at tuberculosis institutes and dispensaries for advice and direction and that general practitioners might become, to a still greater extent than at present, apostles in a movement to diminish the risk of home infection as it bears on the infants and young children destined to be the citizens of to morrow

It is a mistake to frighten the general public by always dangling before their eyes the bogey of tuberculosis To many of them the risk is non-existent and constant "nagging" only leads to weariness and apathy But in the case of infected persons actually capable of spreading the disease through their own carelessness or through the omission of precautions which may well be within their power, the campaign of education can hardly be too intense At the same time it must be on practical lines, and it must take into account the actual circumstances of the particular home in question Very little is likely to be accomplished by eloquent exhortation, but a great deal may be done by discussing in a friendly

and helpful spirit the exact circumstances of the patient during a visit to the home, and indicating tactfully what is possible under the circumstances Judicious help of a material or financial kind may sometimes be necessary to give effort to the recommendations made, and here the funds of after care organizations may be of great assistance, but much can be accomplished by tact and kindness, which cost nothing and are often of infinite value

The opinions I have expressed may well be regarded as superfluous in many well organized areas, where tuberculosis physicians, general practitioners, health visitors, and care committees are already accomplishing wonders on the lines suggested, but few will deny that there are many places where a great deal remains to be done

Tuberculous persons are the one great source of danger in the spread of tuberculosis What I advocate is that they may be converted into the front line troops in our campaign, accepting, as soldiers should, the discipline, the self-abnegation, the constant vigilance exacted from them as the price of victory

1 Godwin J Drolet "The Inheritance Factor in Tuberculosis" American Review of Tuberculosis vol x No 3  
2 Cambridgeshire Tuberculosis Colony Report of the Executive Committee

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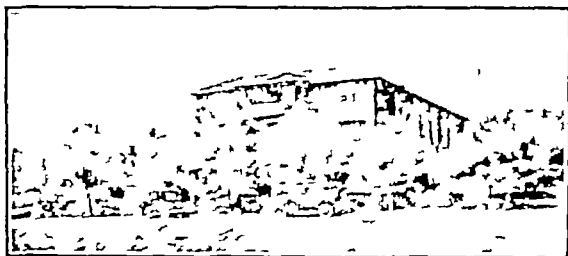
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# DISEASES *of the* CHEST

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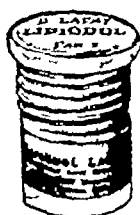
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with Industrial and Welfare Organizations"*

# COMMITTEE ON ECONOMICS FEDERATION OF AMERICAN SANATORIA

*(A National Association of Private Sanatoria and Chest Specialists)*

COTTON AVENUE AND WYOMING STREET  
EL PASO, TEXAS

June 1, 1936

Gentlemen

This is the sixth in a series of open letters addressed to physicians and officials of welfare organizations. If you did not receive the previous issues, we will be pleased to furnish you with copies upon request.

The Brotherhood of Railroad Engineers and Trainmen take care of their tuberculous members in private sanatoria. They receive the best of medical care and attention. Many of these men would have become charity patients were it not for the protection afforded them by their organization.

The sanatoria listed below are the finest private sanatoria in the United States and they are under the direction of capable chest physicians. The Federation of American Sanatoria not only places at your disposal this group of sanatoria, which extends from coast to coast, but in addition offers the proper care of the patient after leaving the sanatorium. This extension service is administered by competent chest specialists, who are members of the Federation and are conveniently located in all of the large cities in the United States.

Learn about this humanitarian project by addressing the Committee on Economics of the Federation of American Sanatoria at the above address.

Sincerely yours,

COMMITTEE ON ECONOMICS

Federation of American Sanatoria

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# DISEASES

OF THE

# CHEST

Official Organ of the Federation of American Sanatoria  
 Editorial offices 1018 Mills Building, El Paso, Texas  
 Business Address Cotton at Wyoming, El Paso, Texas

(A MONTHLY PUBLICATION)

*"The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind"*

Lawrason Brown, M D

## Editorial Comment

**The Kansas City Meeting** THE second annual meeting of the Federation of American Sanatoria, held at Kansas City at the time of the convention of the American Medical Association, has passed into history. The transactions of the meeting will be published and copies sent to all members of the Federation, but some comments on the program are in order at the present time.

In general, the business sessions were carried on in a rather informal manner, so that each physician present entered into a free discussion that was conducive to a clear understanding of the present and future plans of the organization and to a fusion of individual ideas that strengthens any group. It is certain that those in attendance were well repaid for their time and expense.

Scientific discussion was not lacking. Dr. W. W. Buckingham of Kansas City presented a very interesting group of patients in a clinical discussion of chest surgery at luncheon on the first day of the meeting. Dr. Max Rothschild of San Francisco was the chairman of this program. Seventy-five members and guests were greatly pleased with the program at the "Get-Together" luncheon on the second day. Papers were presented by Drs. J. Burns Amberson, L. J. Moorman, and Frank S. Dolley, on various phases of tuberculosis. These papers will be printed

in DISEASES OF THE CHEST so that all may have the opportunity of reading them. The tuberculosis session in the American Medical Association program on the third day, offered an excellent symposium on this disease.

The members present saw fit to reelect all of the officers of the Federation to serve for another year. Therefore Dr. William Devitt of Allenwood, Pennsylvania, remains as president for the coming year, and the sectional Vice-Presidents, Dr. Ralph C. Matson, Portland, Oregon, Dr. George Foster Heiben, Loomis, New York, Dr. Samuel H. Watson, Tucson, Arizona, Dr. Louis Mark, Columbus, Ohio, and Dr. Charles Hartwell Cocke of Asheville, North Carolina, and the Secretary-Treasurer, Dr. R. B. Homan, Jr., El Paso, Texas, remain in these positions.

Dr. Chas. M. Hendricks of El Paso, Texas, Arnold Munig of Denver, Colorado and Champneys H. Holmes of Atlanta, Georgia will continue on the Editorial Board of Diseases of the Chest.

Dr. Devitt has announced that he will retain the same chairmen of standing committees for the ensuing year, who in turn, in collaboration with the President, will select the members of their respective committees. Many of the present committee members will serve a second term.

Dr. E. W. Hayes of Monrovia, California, was chosen President-elect of the

organization Dr Hayes is a nationally known authority on tuberculosis, who has served during the past year as Chairman of the Statistical Committee. The report of this committee was an exceedingly interesting and illuminating one. It will be reprinted in its entirety in the proceedings of the meeting and deserves the close study of each member of the Federation. The time and effort expended by this committee is evidenced by this report.

The officers and members of the Federation should be proud of the progress and activities of the young organization as shown by the reports of its various committees and by the enthusiastic praise which it has received from physicians in general. Judging from the progress made and from the plans drawn up at this meeting to invade fields so far untouched, the next year should bear further witness of the Federation's distinct place in the front lines of the profession's battle with tuberculosis—a battle in which each and every physician should be vitally interested.

R B H JR

**Let Us** Now, that we are safely at  
**Resolve** home, let us resolve, to rededicate ourselves to the purposes for which the Federation of American Sanatoria was formed.

Close co-operation between the physician in the general practice of medicine, the internist, and the chest specialist, to secure an early diagnosis of chest diseases is paramount. The examination of all known contacts and the isolation of the open case of tuberculosis must be carried out with precision.

Close co-operation with all existing agencies engaged in public health work, and in particular with the early diagnosis and case finding campaigns of the National Tuberculosis Association.

Through *DISEASES OF THE CHEST*, the official publication of the Federation of American Sanatoria, we will continue to disseminate knowledge, facts and other data on chest diseases, written in an easy, readable style for the thousands of

physicians who receive this journal each month.

To those physicians who desire a more technical journal on tuberculosis, we recommend the *American Review of Tuberculosis*, published by the National Tuberculosis Association.

And now, let us pledge ourselves, that we will each do our part to carry out the broad principles, as set forth in the program of the Federation of American Sanatoria and that when we meet next year at Atlantic City, we will again take stock of the progress made this past year and again renew those friendships which are so dear to us.

C M H

**This A M A** THE SESSION on tuberculosis in the Section of Miscellaneous Topics of the American Medical Association is worthy of commendation. This program was the first of its kind ever attempted at an A M A meeting and its popularity was evidenced by an attendance of about three hundred physicians who sat throughout the interesting symposium.

It is not surprising that a program containing the names of James Alexander Miller, Max Pinnet, J Burns Amberson, LeRoy S Peters and J J Singer should be well attended. These men are leaders in the field of tuberculosis and their efforts at this program presented in a short symposium the various phases of the tuberculosis problem as it manifests itself today. Epidemiology, resistance, pathology, case finding, and modern methods of treatment were presented in a straight-forward manner that was enjoyable to every man present. Those who found it impossible to attend are urged to read these articles in the Journal of the American Medical Association.

The need of such a program seems plainly evident to the F A S and to *DISEASES OF THE CHEST*. Our feeling is that the leading men in the tuberculosis field are not being heard by the doctor whom the patient first consults with his disease. Certainly there are very few men other than tuberculosis specialists

who attend the N T A Meeting, or the various sectional conferences on tuberculosis. At these meetings the specialists receive and discuss excellent scientific papers on tuberculosis in all of its phases, which stimulates their interest and "keeps them up" with the modern trends of tuberculosis. It seems obvious to us that a similar program should be available to the physician in general practice. The meeting of the A M A is the logical place for such a session, and we believe that the interest evidenced in it this year bears out our thoughts.

In one respect the problem of tuberculosis does not differ from the problem of any other disease. We are continually adding to our store of knowledge in all fields of medicine and in all diseases, but the final page on most diseases must yet be written. Certainly this is true of tuberculosis. The doctor attempts to practice according to the modern concepts in the field of surgery, obstetrics, pediatrics, cancer, etc. He should, therefore, wish to be "up to date" in his handling of tuberculosis, a disease that has caused over 70,000 deaths in the United States in 1935.

For this reason, DISEASES OF THE CHEST strongly advocates the continuance of a symposium on tuberculosis at each A M A Meeting.

Drs James Alexander Miller, Chairman and Charles Hartwell Cocke, secretary of this session deserve mention for the arrangement of this fine program.

R B H JR

**In Appreciation To Kansas City** THE MEMBERS of the Federation of American Sanatoria desire to express their appreciation to the people of Kansas City, to the members of the Jackson County Medical Society, to the numerous committees and to the local Committee on Arrangements for the Federation of American Sanatoria Meeting for the splendid reception and the fine hospitality extended to the members of this association, during their stay at Kansas City, the week of May eleventh.

Your new Civic Auditorium deserves a

word of praise and you may well be proud of this modern edifice. Every known scientific and engineering device which goes into an auditorium has been installed for the comfort and convenience of its guests. The acoustics and arrangements are excellent and we congratulate the City of Kansas City on this fine accomplishment.

To our Committee on Arrangements, we desire to add a final word of praise for their untiring efforts in arranging for and in carrying out the many details of the program and the meeting. M K

**"Get-To Gether" Luncheon Meeting** THE FIRST "Get-to-Gether" luncheon meeting of the F A S, held at Kansas City in conjunction with the meeting of the A M A, was well received by the members of the F A S and their invited guests.

The program presented under the direction of Drs LeRoy S. Peters of Albuquerque, New Mexico, chairman, and Orville E. Egbert of El Paso, Texas, secretary, was well arranged and a good deal of thought was given to the selection of the subject matter, so that a program on various phases of chest diseases could be presented within the allotted time of one hour.

The talks on Serial X-Ray Following Broncho Pneumonia by Dr J. Burns Amberson, Jr., the Management of the First Six Months of Pulmonary Tuberculosis by Dr L. J. Moorman and the Selection of Candidates for Thoracoplasty by Dr Frank S. Dolley were very interesting and instructive. The conservatism sounded by each of them was very heartening. After listening to these learned gentlemen discourse on their conclusions to-date, we can truly say that sane judgement is again on the throne. These papers will appear in an early issue of DISEASES OF THE CHEST.

It is planned to make these "Get-to-Gether" luncheon meetings an annual affair and it is well for the members of the F A S to arrange for their invitations early.

C M H

# Pulmonary Emphysema

ALTHOUGH pulmonary emphysema was first described by Floyer in 1698, who called it flatulent asthma, there has

BY  
CHARLES S KIBLER, M D, F A C P  
AND  
SAMUEL H WATSON, M D, F A C P  
Tucson, Arizona

been little investigative interest in this condition until the last few years. Recently, however, there has been a revival of interest. A number of contributions have appeared in the literature showing both a reawakened interest and an attempt to understand its pathological physiology, yet there is a great deal of controversy about many phases of it, particularly its etiology and effect upon the heart. All observers are agreed that pulmonary emphysema is a diseased condition in which there is dilation of the alveoli with atrophy of the alveolar walls, resulting in increased lung volume and diminished respiratory function.

## *Etiology*

There are so many theories as to the etiology of this condition that it is useless to discuss many of them for the majority are neither convincing nor substantiated by reliable investigative work. The most attractive theory is that small emphysema is caused by a congenital weakness of elastic tissue combined with an increased interalveolar pressure. This theory is substantiated by the fact that emphysema often occurs in comparatively young individuals who have had little or no previous evidence of asthma or bronchitis, and that it also exists in patients who have moderate bronchitis which is insufficient to produce emphysema in the average person. It is difficult to explain emphysema on any other basis. One patient may develop emphysema after a few years of moderately severe asthma or cough, while another may have no emphysema result with even more severe asthma and cough over a long period of time. There appears to be, in different individuals, a varying pulmonary resistance to increased interalveolar pressure. In some the pulmonary elasticity is lost, in others

it is retained under similar circumstances.

Bronchitis rather constantly accompanies emphysema but whether emphysema is present first or bronchitis is the primary condition is a debatable question, resembling that of the egg or the chicken. The sputum of emphysema is of the mucoid type, not purulent, unless it is accompanied by bronchiectasis. Certainly, many cases of primary emphysema have no history of any marked obstructive condition such as asthma or bronchitis.

## *Classification*

Alexander and Kountz (1) classify emphysema as obstructive and non-obstructive, the latter occurring in older patients. In the former it is secondary to obstructive conditions of the bronchial tubes as in asthma and bronchitis. In non-obstructive emphysema it is really not true emphysema at all, but a disease of the inter-vertebral disks which cause the spine to be straighter than usual, and the ribs to be more horizontal than is commonly found, resulting in a barrel shaped chest. They call attention to the fact that the respiratory function is no more impaired in the non-obstructive type than it is to be expected in older individuals. This is substantiated by convincing evidence.

Osler and McCrae (2) present a workable classification of pulmonary emphysema into

Compensatory as secondary to tuberculosis, atelectasis, fibrosis, and bronchiectasis

Hypertrophic which is the usual primary type

Atrophic which is a senile change in the older patients with no increase in the lung volume

## *Symptoms and Physical Signs*

The most striking symptom of pulmonary emphysema is related to impaired

respiratory function, namely dispnoea. This symptom is markedly aggravated by exertion and least conspicuous while at rest. In uncomplicated cases the patient can usually lie down prone at night and be comfortable. Moderate cough and raising of usually a mucoid type of sputum is almost constantly present. Cyanosis occurs in far advanced cases, and it is unique in emphysema that there can be marked cyanosis with comparative comfort. Exhaustion and fatigue are also prominent symptoms as one might expect with dyspnoea and poor respiratory function.

Usually the pulse is rapid and the blood pressure is lower than is to be expected in the normal person.

The physical signs most constantly present are, rounded barrel type of chest with little respiratory movement like one who is trying to breathe in full inspiration, the percussion note is unusually resonant and the bases of the lungs are rather immobile and depressed, cardiac dullness is diminished and the heart tones are faintly heard because of over-distended lung lying between the heart and the anterior chest wall, the respiratory sounds are diminished and expiration is markedly prolonged. Vital capacity readings are constantly diminished to a marked degree, usually 50% or more. Venous blood pressure readings are increased. However, these last two findings are present in other conditions, notably cardiac decompensation.

#### *X-Ray Findings*

The x-ray and fluoroscope frequently give valuable help. Often the diagnosis can be made from this examination alone. Fray (3) presented an excellent article describing these findings. Briefly these are —

- 1 Low or flat diaphragmatic shadows with decreased movement
- 2 Increased aeration of the lung fields and an absence of a change of radio lucency on respiration
- 3 Diaphragmatic shadows, especially the left, are unusually brilliant even on

expiration due to increased residual air in the lungs

4 Increased width of intercostal spaces and a horizontal position of ribs

5 Bulging or flaring of ribs over lower axillary regions

6 Emphysematous blebs or bullae

7 Increased peribronchial markings

However, these findings are naturally more prominent in the most aggravated cases and are not very commonly present in early or moderately advanced types. Indeed, many cases of emphysema are not recognized at all by x-ray or fluoroscopic examination although marked clinical symptoms are present. Nevertheless, the Roentgen ray is a valuable aid in diagnosis when combined with symptoms and physical signs.

The electrocardiograph offers little help. Right axis deviation is not constantly present although this is probably present more often than any abnormality.

Blood examination reveals that haemoglobin and erythrocyte readings are higher than normal, as usually occurs with cyanosis. The amount of carbon dioxide in the blood is increased while oxygen is diminished. When pulmonary emphysema is marked, the venous blood pressure is always elevated. The superficial veins are prominent and distended even though the blood pressure is lower than is normally found. At the bedside this increased venous pressure can be roughly estimated by holding the hand on a level with the right auricle and finding how high above this point it is required to raise the hand to produce collapse of the veins. Venous pressures are normally 4-6 cm of water pressure. Normally the veins should collapse when the hand, for instance, is raised this distance above the level of the right auricle. It requires a higher level than 4-6 cm for venous collapse in well marked pulmonary emphysema.

#### *The Heart in Emphysema*

The evidence as to whether or not the heart is involved in emphysema has been very confusing. Earlier writings on this subject mentioned obstruction of pulmo-

nary circulation due to atrophy of the alveolar walls and obliteration of the capillary bed. However, autopsy findings nearly as often revealed a small or normal sized heart with unaltered chambers as it did a hypertrophied and dilated right ventricle. Most authorities are agreed that there is diminution or obliteration of the usually negative intrapleural pressure and an increase in venous pressure which impedes the return of blood to the heart. The question arises whether the heart was normal in size or smaller due to the fact that the heart was not receiving enough blood. Indeed oedema of the extremities is a very frequent finding in emphysema, even in the absence of convincing evidence that the heart is decompensated. Landis (4) while studying capillary permeability relative to oedema found that the two conditions conducive to accumulation of fluid in the tissues were anoxaemia and increased capillary pressure, both of which are present in pulmonary emphysema to a marked degree. Kountz, Alexander, and Prinzmetal (5) presented a valuable contribution to this subject showing that in the majority of cases of pulmonary emphysema coming to autopsy, there was dilatation and hypertrophy of the right ventricle with left ventricular hypertrophy. They produced emphysema in dogs by causing atelectasis of a considerable portion of the total lung volume. Autopsies performed on these dogs revealed almost identical findings in the hearts of these animals as were found in human subjects. They suggest that the presence or absence of abnormal cardiac findings depends on the degree of emphysema. They believe that if more than 50% of the total lung tissue is destroyed there will be involvement of the heart.

#### *Emphysema in Fibroid Tuberculosis*

In pulmonary tuberculosis there is destruction of lung tissue which is replaced by fibrosis and contraction during the healing process. Naturally the area of the resulting fibrosis is smaller than the

area of the original lung. This is particularly true when cavitation has been obliterated by scar tissue contraction. As the chest cage is fairly well fixed and does not fall in readily, compensatory emphysema results. In young individuals the ribs are apt to bend inward somewhat preventing compensatory emphysema, because the chest cage is more pliable than in older individuals. When fibrosis is marked, considerable compensatory emphysema follows, often with flaring out of the ribs in the lower axillary regions and formation of emphysematous blebs. This same mechanism obtains in any other situation, causing loss of lung volume, as in bronchiectasis with atelectasis, pneumoconiosis, obstructive atelectasis and other conditions. Compensatory emphysema presents much the same symptoms as in the primary or obstructive type, but in addition it is apt to have some of the symptoms of tuberculosis. Frequently the tuberculous toxemia results in brown atrophy of the heart causing additional decrease in cardio respiratory function. When marked fibrosis is present, there must be marked compensatory emphysema unless some other mechanism relieves the situation as for instance a rise of the diaphragm or bending in of the chest wall.

#### *Differential Diagnosis*

Pulmonary emphysema is frequently associated with bronchial asthma and heart involvement and for this reason it may present unusual difficulty in diagnosis requiring prolonged observation and considerable aid from the laboratory and x-ray specialists. It is quite frequently accompanied by bronchial muscle spasm producing wheezing and prolonged expiration which can be relieved by epinephrin and ephedrine. This condition should be called pulmonary emphysema accompanied by bronchial spasm to distinguish it from bronchial asthma. Indeed, true pulmonary emphysema is caused by prolonged bronchial asthma and the differentiation may seem almost impossible. It is helpful to remember that in order to produce pulmonary

emphysema secondary to bronchial asthma, it usually requires a long period of time and seldom results in a few years. This may aid in distinguishing which disease condition was really primary.

Congenital cystic disease of the lung causes dyspnoea and similar physical findings in the lungs. Roentgenograms can usually distinguish between these conditions.

Heart disease in older individuals may give considerable difficulty because the heart is so frequently involved in far advanced emphysema. Furthermore, passive congestion of the lungs masks the typical x-ray appearance of emphysema because pulmonary oedema and engorgement of pulmonary vessels blur the peribronchial markings and lung fields. Reduced vital capacity, pulse elevation, and dependent oedema are present in both conditions. In the presence of congestive heart failure there may be noisy wheezing respiration so well described by McGinn and White (6) which simulates asthma very closely; indeed Cardiac asthma is not relieved by epinephrin while pulmonary emphysema with bronchial spasm is usually benefited. Basal lung rales, enlargement of the liver, and cardiac irregularities favour the diagnosis of heart disease while the barrel chest, the low immobile position of the diaphragm incline toward emphysema.

Fibroid tuberculosis with emphysema can usually be recognized easily by physical examination with the aid of properly exposed x-ray films if the fibrosis is marked. Both conditions may be present, however, independently.

Even in the hands of the most skilled the diagnosis of emphysema may present a most difficult problem when it is accompanied by heart failure or other pulmonary disease.

#### *Treatment*

The treatment of all types of emphysema except the non-obstructive, necessitates not only the diagnosis of the presence of emphysema but also the recognition of the degree of disability. The patient must live strictly within his

limitations and recognize the degree of his handicap for exertion beyond this point causes marked fatigue and is apt to cause a progression of his disease. Therefore, a carefully outlined regime of rest and exercise is vital to his welfare. It has been our experience that a dry, warm climate with a moderate altitude is decidedly beneficial. To our surprise, sufferers improved in spite of living in an altitude two thousand feet higher than they were accustomed to. As their bronchitis improved, their dyspnoea was also benefited. Apparently a dry, warm climate is more important than the disadvantage of a moderately higher altitude.

Every precaution should be taken against respiratory infections for they markedly increase dyspnoea and may result in a serious setback.

Years ago we found that ephedrine sulphate given several times daily benefits the majority of cases by reducing dyspnoea and cyanosis, and in a few the benefit is remarkable. Many patients say they cannot get out of bed in the morning unless they take this preparation first. Epinephrin should be used hyperdermatically if the dyspnoea is more urgent.

Oxygen therapy is very helpful in relieving dyspnoea and cyanosis. It can be used rather inexpensively by administering it for short intervals by nasal catheter or mouthpiece when the dyspnoea is most marked. The relief obtained by oxygen therapy lasts long after its administration is discontinued.

Digitalis is beneficial only when there is heart involvement with dilatation. If it is to be given, it should be administered according to the method of Eggleston (7), (8), giving approximately one grain of digitalis for every ten pounds of body weight within one or two days, and subsequently giving once daily, a maintenance dose which is about one half to two grains according to individual variations.

Recently abdominal belts have been

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# The Limitations of Physical Signs in the Diagnosis of Pulmonary Tuberculosis

IT IS NOW becoming widely accepted that the presence of rales in the upper chest is the physi-

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cal sign which has the greatest value in the diagnosis of pulmonary tuberculosis, it is, especially in early cases, the sign upon which real reliance can be placed

Not only are other signs extremely variable and, in early cases, inconstant, but we all know that because the right apex is in contact with the resonating trachea, there is increased transmission of breath sounds, tactile fremitus, and vocal resonance on the right, as compared with the left. It is often difficult to say just when, as regards these signs, the normal becomes abnormal.

There is nothing difficult or mysterious, on the other hand, in obtaining rales if they are present. They are sometimes fine but usually are moderately coarse and though they may be missed during quiet breathing, can easily be heard if one listens carefully after the patient coughs at the end of expiration.

Now, how often are these rales present in tuberculosis? Heise (1) & Brown (2) of Saranac Lake found the percentages in a large series as follows:

Fair Advanced—90%

Moderately advanced—75%

Minimal cases—27%

In only about one fourth of the cases at the stage at which tuberculosis should be diagnosed, could the most reliable physical sign be found.

The diagnosis of the presence of a cavity by physical signs is a very uncertain matter. Another recent study (3) shows that 50% of large, and 80% of small cavities as revealed by x-ray, will be missed by physical findings. These figures leave the examiner little reason to be proud of his skill.

What are the reasons for this sad failure?

1st The only cavity known in pre-x-ray days was the one found at autopsy—a large hole sur-

rounded by a thick fibrous wall and a zone of consolidated or fibrotic lung, and usually having a free bronchial communication, of course, it gave physical signs. Now roentgenogram distinguishes all sizes of *young elastic thin walled* cavities, which may appear suddenly and disappear, sometimes, almost as suddenly. These cavities usually give no physical signs whatsoever. In fact, for a long time tuberculosis men refused to call them cavities at all. They either said that the x-ray was wrong altogether, or that they were merely *annular shadows*!

2nd Minimal, or as it was called "incipient" tuberculosis was conceived of as always appearing first at the apex of the lung, that is, in the relatively exposed area which extends above the clavicle, and a great many refinements in physical signs were evolved, such as cogwheel breathing, narrowing of Kligens isthmus, and so forth, to detect early changes in this area. A recent study (4) based on 1,000 cases shows that infraclavicular involvement is more characteristic of incipency than apical, which is usually secondary, in addition the infraclavicular type is usually acute in onset and goes to cavitation well within six months, while the primary apical incipient involvement is apt to be insidious and slow in development, with late cavitation. In other words, the type of early involvement which should be diagnosed as soon as possible is more often found below the clavicle where it is farther away from the stethoscope and is surrounded by a zone of normal lung which may present normal physical signs.

3rd The x-ray can detect tuberculous lesions down to 2 millimeters in diameter. It is rather difficult to conceive of such lesions having any influence on the character of physical signs. (The Ameri-

From a paper given at the Celsinger Memorial Hospital at Pottsville, Pennsylvania, October 25th, 1935.

ican Sanatorium Association's classification of tuberculosis gives "minimal tuberculosis" the generous estimate of "mottling of infiltration not larger than an area from the apex to the level of the second rib anteriorly of one lung")

Of what value are rales in interpreting the progress of a given case, once they are elicited? Here again one may be easily deceived. While in general a decrease in number and area of rales occurs as the lesion disappears, one can place no great importance on this finding. Rales may increase or decrease while the lesion is healing, may persist after the disease is arrested, or remain unchanged when new areas of involvement are taking place. The physician must rely somewhat on symptomatic improvement and very heavily on the changes noted in serial roentgenograms taken at 2 to 4 month intervals, as well as on the presence or absence of tubercle bacilli in the sputum, and such laboratory checks as the blood sedimentation rate and interpretations of the leucocyte count.

If no great reliance is to be placed on stethoscopic findings, how is one to make an early diagnosis of pulmonary tuberculosis? Of greatest importance is the history, and in the history the following points are to be emphasized —

1 *Fatigue* This is the most constant early symptom and usually precedes all others. The individual complains that his fatigue has been gradually increasing, and that even after a good night's rest he is just as tired as when he went to bed.

2 *Cough* The cough is usually slight and dry at first, and may be attributed to "cigarettes" or "chronic bronchitis." It should be a rule that any cough of more than one month's duration should be considered as of tuberculous origin until proven otherwise.

3 *Loss of weight* Progressive weight loss when present should arouse suspicion, but frequently other symptoms will be much more significant. The fact that the patient has not lost weight should

not lull suspicion aroused by other findings.

4 *Pleurisy, with or without effusion* Frank pleurisy should almost always be considered of tuberculous origin, unless proven otherwise. Even without this finding, however, most tuberculous individuals complain of shifting chest soreness or heaviness, and this may be a valuable clue.

5 *Hemoptysis* Frank hemoptysis is an indication of the presence of tuberculosis in so high a proportion of cases that this finding should never be dismissed until an accurate diagnosis is made.

6 *Tubercle Bacilli in the sputum* Early tuberculosis can and should be diagnosed before tubercle bacilli can be demonstrated in the sputum, for this finding is usually preceded for a variable period by one or more of the above symptoms, and repeated negative sputum examinations should not lead one to dismiss the diagnosis of tuberculosis when suspicious symptoms are present.

#### Conclusions

When suspicion is aroused by any of the above findings, good stereoscopic roentgenograms are always indicated regardless of negative physical findings or appearance of the patient. We must get away from the idea that the tuberculous patient must resemble the textbook pictures of the cadaverous "consumptive" we know so well.

Whenever one case is diagnosed, others may often be discovered by

(a) Tuberculin testing all children in the patient's family and having x-rays of positive reactors.

(b) X-rays of every adult in the family may reveal the source of infection in the patient you have already diagnosed.

Tuberculosis is, first of all, a household disease, and by investigating the patient's relatives, one may discover cases of tuberculosis before symptoms and physical signs have appeared—that is a real achievement in diagnosis and

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# Bronchiectasis

BRONCHIECTASIS is a chronic infection of the bronchi which gradually weakens the bronchial wall

in such a manner as to ultimately result in either a cylindrical or saccular dilatation of the affected bronchus, and next to pulmonary tuberculosis is probably the most frequently encountered chronic pulmonary affection known. While it may originate as a unilateral condition, it practically always becomes bilateral as the disease progresses. It occurs more frequently in males than females, and while it may occur at any age period, it is most commonly found between the ages of twenty and forty, although it may be unrecognized for many years.

The causes of bronchiectasis are numerous and varied, and many conditions have been blamed for the changes occurring in the bronchi. It is known to be congenital in many individuals and frequently occurs in several members of the same family, while in other patients an alternation in the bronchial secretions is supposed to favor invasion by noxious bacteria which finally leads to a weakening of the bronchial wall and allows dilatation to occur.

Some observers believe the condition is due to a loss of nerve control of the bronchus. Acute infectious diseases are known to cause bronchiectasis, and following the influenza pandemic of—1918-1919—there was a tremendous increase in the incidence of this condition. More recently it has been observed that chronic sinus infection is generally associated with this disease and must therefore be a causative factor in its production. Any condition that produces an obstruction to the free outflow of air for a long period of time will eventually cause bronchiectasis. The commonest cause is probably any chronic pulmonary disease such as chronic bronchitis, asthma, or chronic pulmonary tuberculosis, which is characterized by long continued cough or ex-

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piratory effort. When the patient becomes annoyed by the symptoms produced by this condition, the disease is already in the advanced stage. The predominant symptoms are cough and expectoration, and the character of these symptoms is distinctive. The patient may pass a great part of the day or night without any difficulty and then in a severe paroxysm will bring up copious quantities of purulent foul-smelling sputum. This can be readily understood when it is considered that the dilated bronchus acts as a reservoir in which secretions stagnate and decompose until discharged. Sometimes change of position will bring about a violent attack of coughing, probably due to the fact that some of the secretion flows from the dilated bronchus to a normal tube. The severest paroxysm generally occurs in the morning upon arising, and the patient may bring up most of his sputum at that time. The amount of sputum expectorated in twenty-four hours generally is very large, varying from 200 to 1,000 C.C. Hemoptysis is also a common symptom, and even large hemorrhages are not a rare occurrence, and this has led many patients to be diagnosed as suffering from pulmonary tuberculosis instead of bronchiectasis, although it is not at all uncommon for both diseases to exist in the same individual. Clubbing of the fingers is probably more pronounced in bronchiectasis than in any other chronic pulmonary disease.

As a general rule the bronchiectatic patient is well nourished and capable of doing full time work for many years, until the paroxysmal cough and foul sputum make it embarrassing for the sufferer to mingle with his fellow workers. Occasionally dermatitis occurs with the reservoirs of purulent secretion acting as a focus. Colitis may occur in those patients who are careless enough to swallow their sputum over long periods of time. High fever,

weakness, progressive loss of weight and inability to work appear late in the disease and generally lead to a fatal termination. In some mild forms of bronchiectasis, the symptoms are very benign and the patient suffers very little inconvenience from his disease, but these are generally unrecognized and consider themselves suffering from chronic bronchitis.

Our greatest advance in making an early diagnosis of this condition has been made rather recently, and consists of an iodized oil injection into the bronchial tree through various means. The oil in the bronchi casts a dense shadow on a roentgen film, and the dilations can readily be recognized by comparing them with the normal bronchi shown on the plate.

The treatment of bronchiectasis in the past has been chiefly medical, but as the results were more or less unsatisfactory and yielded relatively few cures, surgery has been much more frequently employed during more recent times. In those cases in which surgery is precluded due to the advanced stage of the disease in both lungs, medical treatment has to be depended upon, and consists of the patient devoting his life to taking care of his health.

The patient gets along more satisfactorily in a dry warm climate in the winter time. Postural drainage is very important and the most favorable position should be studied for each patient. Generally this consists of sleeping with the head lower than the feet. Attention should of course be directed towards the sinuses and these should be treated if infected. Intra-tracheal injections of various deodorizing and antiseptic solutions have been used with considerable benefit. Among these solutions, it was accidentally discovered that the iodized oil used in making the diagnosis is of greatest worth. Various inhalations or vapor baths are recommended, and limiting the fluid intake to a minimum has a tendency towards reducing the amount of sputum expectorated. Vaccines prepared from the organisms found in the bronchial dilatations have proved rather disappointing, so that while medical treatment may be of help as a palliative measure, it

can be dismissed as a curative agent.

While there are certain dangers to be encountered in the surgical treatment of bronchiectasis, in the properly selected cases, it holds forth greater promise for cure. At the present time the most widely practiced surgical procedure is some form of collapse treatment, and the simplest of these is the induction of pneumothorax where a space can be obtained. In the ideally selected case this treatment has been productive of brilliant results. In other patients in whom pneumothorax cannot be administered, phrenic neurectomy has brought about very striking results. A word of caution might be in order at this point, namely, that this procedure should not be performed in the old uncollapsible bronchiectatic lesions, as the abolition of the pumping action of the diaphragm might promote stagnation of secretion. In certain selected cases in which neither of the above measures are practical or successful, thoracoplasty is often a procedure that brings about a cure. Other surgical measures, such as draining the bronchial dilatation externally through the chest wall, or removing an entire lobe of the affected lung, have been resorted to, but the mortality is very high and the operation is not commonly performed.

Untreated or neglected cases can carry on for many years progressing downwards slowly until secondary degenerative changes occur in other vital organs of the body and lead towards a hopelessly incurable condition with a fatal prognosis.

### *Pneumothorax Directory*

The Pneumothorax Directory listing the members of the Federation of American Sanatoria who are qualified and equipped to give pneumothorax is now being prepared for the press.

If you are eligible for membership in the F A S and are equipped to administer pneumothorax, and have not as yet applied for a listing in the directory, you are advised to make application at once.

No further applications will be accepted after June 20th, 1936, for a listing in this year's directory.

# Childhood Type Tuberculosis

SO MUCH has been said and written about childhood tuberculosis, that it is not without a certain

amount of diffidence this paper is written. It is not with the thought of offering any new or original data, but rather in the hope that it may prove of interest to present the picture as it has taken form in the course of sixteen years' observation of many thousands of children who have passed through the Municipal Tuberculosis Clinics of Baltimore.

The material has been gathered in the routine examination of open air class pupils, candidates for preventorium care, the examination of child contacts, and the usual "run-of-the-mine" children that are brought to the clinics for malnutrition, persistent cough or similar symptoms.

It should be mentioned that the childhood type of the disease is not necessarily confined to children any more than the adult type is confined to adults, but has received its appellation through its more common occurrence as a clinical entity in children, just as the more classical signs of tuberculosis are usually encountered in adults.

It was not until the work of Landouzy (1) (1885-91) and of Ghon (2), Pirquet and Naegeli in the early part of the present century that tuberculosis was recognized as an infection frequent in childhood. Prior to this, and due largely to our lack of knowledge of the tuberculin test and the infancy of the roentgen ray, tuberculosis was considered a disease chiefly affecting young adults and recognized in the pulmonary or adult form by the usual signs and symptoms, including the discovery of tubercle bacilli in the sputum. There is little doubt that most of these young adults who developed the disease in the nineteenth century, were then, as now, the victims of an infection that had been latent and unrecognized

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from early childhood.

Young people who have been harboring tuberculosis for years, finally break down when they assume the burdens of work and the heightened responsibilities common to late adolescence. The child may overcome many physical handicaps. If he tires at play, he can stop, and his days are spent largely out of doors. Once school days are ended, the average boy and girl goes to work, they are soon married and the young husband must work hard at his job to support his home, while the young wife assumes the tasks of a household and in addition to these must usually bear children. A latent tuberculous focus soon becomes manifest and the pulmonary type or adult form is apt to develop.

*Modes of infection.* This occurs usually through direct contact between the child and an open case of tuberculosis. The infant nursed in the arms of a tuberculous mother, the young child crawling about the floors of rooms occupied by tuberculous patients, or fondled and caressed by the sputum positive case, soon becomes infected with the disease.

*Pathology.* Tubercle bacilli may gain entry through direct inhalation of dry bacteria or by ingestion. Less commonly, infection may occur through the eyes or nose, as when, for example, the sputum-soiled handkerchief of a patient is used to wipe the eyes or nose of a child. Having entered the child's system, the bacillus does not necessarily set up tubercle formation. Not infrequently, it simulates typhoid fever, or, in less severe cases, may be mistaken for grippe or a protracted febrile gastro-intestinal disturbance. This appears to be the initial onset of the primary infection. In most instances, however, tubercle formation does occur after a varying length of time in one or more of the lymph nodes that may or may not be near the site of infection. Such infection may be very in-

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sidious and give rise to no recognizable clinical symptoms other than a *tuberculin sensitization conferred upon the infected individual*. In such cases, the tuberculin test is the only means of ascertaining the presence of the infection.

The lymph nodes commonly affected are those clustered about the trachea and large bronchi at the roots of the lungs, the mesenteric glands, and the peri-bronchial group which are very small and numerous and found along the course of the bronchial tree throughout the lungs. All of these nodes are connected by a network of lymphatic channels that renders communication from one to another very free. They are in turn connected with the lymphatic system of the lungs and pleurae, the cervical chains above and the diaphragmatic groups below.

Prior to the age of three years, there is great danger of these glands caseating, breaking down and disseminating into a generalized milary tuberculosis, usually fatal. After three years, however, the child appears to possess a better defense mechanism which promotes fibrous tissue and calcification and so inhibits the spread of tubercles.

*Signs and Symptoms* After the initial infection has run a course of several weeks, if milary or pneumonic forms do not develop, the child apparently recovers, plays about again as usual and may seem quite well. Careful scrutiny will usually reveal that all is not right. There is an intangible change in the child. He may be listless at times, the appetite is not quite so good, the cheeks are a little pallid or even have a wax-like appearance. There is often a persistent rise of temperature daily to 99 or 100 degrees, and frequently the child fails to gain weight normally. A child that does not gain normally is really losing weight. If he should normally gain ten pounds in a year and gains but five, he has really lost five pounds. This is a point frequently overlooked, although weight discrepancies should not be the accepted hall-mark of tuberculosis since many tuberculous children are normal or even overweight. It has been our

experience that the majority of tuberculous children are definitely below the usual weight standards. Moreover, we have found the normal or overweight tuberculous children much less a problem than those whose infection is complicated with malnutrition. This extra weight, if present, provides reserve strength to oppose the invader.

Another manifestation of latent tuberculosis in children is the apparent lack of resistance displayed to other infections. Not uncommonly a mother will inform us that her child has had every juvenile disease on the calendar, or that common colds are frequent. These cases remind one of a nation at war with a major power, successfully holding its own against the principal enemy, while lacking the reserve forces to combat numerous raids of minor marauders across unguarded frontiers. Children who fall sick frequently with all sorts of childhood disease should be studied with tuberculosis in mind.

Hoarseness, continuous or intermittent, may be present and is due, either to reflex nervous stimuli, or, more commonly, to pressure upon the recurrent laryngeal nerve by enlarged lymph nodes. It is practically never due to tuberculous laryngitis, which is very rare in children. Laryngitis, if present, is due to some associated benign infection.

Cough may not be present at all, but many of these children do present this symptom, not because of the tuberculous infection itself, but more often because of a concurrent bronchitis brought about by frequent non-tuberculous respiratory infections, post-nasal drainage and similar catarrhal disturbances reflecting the lowered resistance present.

Sputum, when present, is like cough, usually due to associated bronchitis or other respiratory infections rather than to tuberculosis. Occasionally tubercle bacilli are found in the sputum of children or on swabs from the pharynx, but so rarely does this occur that it is a negligible consideration. It is only when a child has developed the adult type that the sputum

becomes positive. These children are generally quite ill and usually die.

Enlarged glands in the neck are due to a variety of causes, chief of which is tonsillitis. If the cervical groups are enlarged, tuberculosis should be kept in mind as a possible cause. This group is more apt to be the site of an extension of the lymphatic focus lower down.

Fatigue out of all proportion to the energy expended is one of the most common symptoms of childhood tuberculosis. They tire easily and are frequently accused of laziness by teachers and parents.

Pleurisy with effusion is often present, and if not accompanied by pneumonia, should be considered tuberculous. It has been our experience that such pleural effusions may exist without their presence being suspected. Really amazing quantities of fluid may be discovered in the pleura on physical or x-ray examination with relatively little disturbance in the child's ability to play about.

Most physical signs are conspicuous by their absence. The pleural effusions are, of course, as conspicuous on physical examination as in older subjects. Parenchymal lesions, which are nearly always of insignificant size, and slight or moderately enlarged mediastinal glands, can rarely be demonstrated by physical examination. D'Espine (3), devised the sign which bears his name. It is the accentuation of whispered voice sounds to the fourth or fifth dorsal vertebra. The stethoscope is placed over the eighth cervical vertebra, and with the child's head bent forward, he is told to whisper "one, two, three" to get the normal intensity. The process is repeated over each vertebra below until the whisper suddenly fades. Normally, this occurs at the first or second dorsal, but if there are enlarged tracheo-bronchial glands present, the whisper retains its sharp, sibilant quality to the fourth or fifth dorsal. The sign, while not always present, is fairly dependable.

Ziskin (4), of Lymanhurst, reported a sign frequently present in mediastinal glandular enlargement. This is a systolic heart murmur, heard at the cardiac apex

or the left margin of the heart, and due to enlarged nodes pressing upon the pulmonary artery. The sign, while not constant, occurs with some degree of frequency. If present, it should be noted as an additional clue to underlying pathology.

The tuberculin test affords us our greatest single measure for separating the suspicious from the negative. It is the starting point for all our investigation into the possible presence of tuberculosis in children. The Mantoux or intradermal test is the more reliable method, the first dose being 1/100 milligram if the stock tuberculin used is known to have a high potency, that is, if the reactions found to develop with 1/10 milligram are repeatedly very marked. Many of the commercial brands of tuberculin permit of starting with the dosage of 1/10 milligram. In either case, if the first test is negative, a second dose of 10 milligram is injected intradermally after forty-eight hours, and if this is also negative, the child may be considered non-tuberculous ordinarily. The older method of Pirquet of scarifying the epidermis through a drop of tuberculin is not as dependable as the intradermal test, but is useful if the examiner does not have ready access to the freshly prepared dilutions needed for the latter test, which must be renewed weekly, kept cool, and require preparations under careful laboratory technique. The Pirquet method is also of value when parents object to "needles." Recently, more conveniently prepared modifications of tuberculin dilutions have been placed on the market in the form of tuberculous protein extracts. These are put up in packets containing six to twelve tests, keep fairly well and may be prepared in a few minutes when needed. The preparation is not quite as strong as a good grade of tuberculin, properly diluted, but for all ordinary purposes, it may be used with confidence.

A positive tuberculin test does not necessarily mean active or even latent tuberculosis, but merely reveals the fact that the child has been infected at some time. About twenty-five per cent of all school

children for example, are positive reactors and the test eliminates seventy-five per cent of any given group of such children by a simple and inexpensive process. In the case of the individual child, it tells us whether or not the child has been exposed and infected some time in the past. The younger the child with a positive reaction the more likelihood of his having an unhealed focus of tuberculosis.

Over fourteen years of age, there is little value in the positive test, but a negative test informs us we are not apt to be dealing with the disease. Occasionally, children who have recently had acute infectious diseases, particularly measles, may react negatively even when tuberculous infection has taken place. The test is frequently negative in the terminal stages of tuberculosis. For all ordinary purposes, these exceptions may be disregarded.

The x-ray examination of all positive reactors is the next step in diagnosis and is the only certain means by which one can determine the presence of either mediastinal glandular disease or the very small parenchymal lesions so often present. Frequently the glandular shadows are quite distinct with the aid of a good fluoroscope, but if not, the film should be used, as small glands and the tubercles of Ghon are rarely found by any other means.

### *Treatment*

Primarily this must include the four cardinal principles laid down by the National Tuberculosis Association.

(1) Termination of contact with the source of infection, either by strict isolation of the infective case, or preferably by separation of the two, by removal of one or the other from the household.

(2) Rest through the avoidance of excessive physical exercise and the mental strain of ambitious school curriculums.

(3) Tonic measures for improving the general health of the child and the correction of defects.

(4) Care in maintaining the psychological balance of the child that will prevent

his developing inferiority complexes on the one hand or over-indulgence in active pursuits on the other.

It is not always an easy matter to carry out this program. The inadequate laws on our statute books to enforce the separation of an open case from those around him, the difficulties often encountered of getting the open case away to a sanatorium, and of keeping him there when he is away, the crowded condition of many homes, and the economic status of the family are all factors that defeat the first of these principles. The length of time the child must be kept under observation, the natural propensity of children to indulge in excessive exercise, the difficulty of obtaining adequate medical care, the effect of age, race, environment and resistance are adverse factors in carrying out the second and third principles. The fourth, which has to do with the psychological adjustment of the child, is easily demoralized by ignorant neglect on one hand and over-solicitous pampering on the other.

We must not lose our sense of proportion in the approach to this problem. The great difficulty in determining where infection leaves off and disease begins, and the mass of confusing opinions relating to this transition render it an extremely perplexing question.

Although approximately twenty-five per cent of all school children are positive reactors, but four per cent will reveal sufficient evidence of childhood type tuberculosis to require their being kept under observation, and less than half of these will need actual treatment. These figures are derived from the studies and conclusions reached by the Massachusetts Department of Public Health after the examination of several hundred thousand school children. We must be guided by a number of factors and again, age, race, environment and apparent resistance will play an important role, together with the presence or absence of symptoms and physical findings.

*Age* Children under five years old must be watched very closely, as most of the deaths from tuberculous pneumonia



and military disease occur in this group. Infants are prone to develop meningeal tuberculosis. The x-ray must be freely used in infancy, as many massive pulmonary changes may be present with few or no physical signs. Grade school children, as a whole do well, even in the presence of active disease, fatalities are exceptional. Over fourteen years of age, there appears a tendency to develop the adult type of tuberculosis. This is unfortunate as it is at this age that we are apt to lose track of these children. In their teens, boys are neglectful of health examinations while prone to indulge in violent exercise such as foot-ball, basket-ball and track running. Girls at this age are shy and object to physical examinations just as the menstrual cycle is established with its added physical and nervous instability.

*Race* Negro children are prone to develop the more serious adult and pneumonic types of tuberculosis at all ages. In addition, their environment is usually unfavorable. How much the latter is responsible and how much is due to an inherent racial lack of resistance is a moot question. Probably both are factors.

*Environment* Children living in crowded homes, in poor hygienic surroundings, attended by ignorance, indifference and neglect, and denied the benefits of fresh air, sunlight and adequate food are obviously in greater danger than those more favorably situated. Tuberculosis death rates in both adults and children rise in direct proportion to the congestion of population in any given district.

*Apparent Resistance* Normal or overweight children appear to resist tuberculosis much better than the malnourished anaemic types. An apparently healthy child, who plays normally, is abreast of his schoolmates in class-room work and whose appetite is normal presents a much more favorable prognosis than the pale, malnourished child, retarded in his school curriculum and of a finicky appetite.

*Physical Findings* Children with tuberculous infection may be divided into five groups

(1) Positive tuberculin reactors, who show no evidence of the disease on x-ray examination or else only a slight root infiltration and appear to be in normal health. These make up the great majority of cases.

(2) Positive reactors who show no evidence of the disease on x-ray examination, but are obviously in poor health, undernourished and anaemic.

(3) Positive reactors who reveal small calcified nodes in the root or parenchyma of the lung.

These three groups should be examined periodically, every two to six months according to the gravity of the clinical picture or the seriousness and frequency of exposure. These examinations should be continued until the child is of age or until his health has improved beyond any likelihood of his developing the disease. All contact with any known source of infection should be terminated as promptly as possible.

(4) Cases with definite pulmonary changes.

(5) Cases with large root nodes that have not undergone calcification.

These two groups should receive intensive treatment, generally bed rest at the outset, and preferably in a sanatorium.

#### *Open air school rooms*

It is very doubtful if open air, per se, plays any part in the treatment of tuberculous children. The regimen of additional food, graded exercises according to the indications of the individual case, and possibly the relaxation of the rest period when the child is made to lie down for an hour each afternoon may be of value. Under no circumstances, should a child considered actively tuberculous be placed in an open air class. It is the first three groups and the ex-sanatorium (cured) cases that may be referred to these classes. Most of the measures carried out in these classes are applicable in any modern, well-ventilated school-room without constructing special and expensive additions. Every effort should be made to prevent unfavor-

able psychological factors developing in the child's mind while attending such classes, and the treatment should be carried out only if accompanied by a well planned regimen in the child's home. This coordination between the home management of the case and the school-room program requires the fullest co-operation by the parents of these children. All too often, parents feel that the mere attendance in a special class of this type constitutes all that is necessary in the treatment of the child's condition.

### *Preventoria*

There seems little doubt that a well managed preventorium is a useful adjunct in the treatment of children infected with tuberculosis. It serves a valuable purpose both in preventing development of the disease, separating the child from known sources of infection until the open case is disposed of, and lastly, the post-sanatorium cases may be transferred from the sanatorium to the preventorium in order to grade the child from the relatively limited activities permitted during sanatorium care to those that may be expected when he returns to normal home and school life. The time factor is most important in preventorium treatment. The child must remain there as long as his condition requires such a regimen. Here again, the home management must be coordinated with the treatment received. Discharging children from the well-ordered environment of a preventorium into bad home surroundings will not only undo all the good accomplished in the former, but may prove actually harmful by a sudden reversal of an environment to which the child has become accustomed.

### *Case Finding by Means of Children*

The discovery of these cases, even those who are merely positive reactors, is one of the most valuable aids we have for revealing adult cases in the home. The positive reaction on the child's arm is a striking reminder that somewhere in his

environment he has been in contact with an open case. It is the opening wedge for direct inquiry into the health of the family and is a valuable "talking-point" in impressing upon the discovered open case the danger he may be to those about him.

### *Conclusions*

Any program for the prevention and treatment of tuberculosis in children should include

(1) Means for the discovery and supervision of all open cases, with particular emphasis on the isolation of the advanced case.

(2) The local health officer should be empowered to commit the recalcitrant and deliberately careless open case to an institution where he will not endanger those about him.

(3) Contacts should be examined and re-examined periodically.

(4) School children should be examined yearly if possible and the highest attainable level of children health should be maintained by correcting all physical defects. Special emphasis should be laid upon the examination of high school students.

(5) Active cases should receive adequate treatment, preferably in a sanatorium.

(6) In order to prevent infection of children with the bovine form of the disease, the milk supply of the community should be pasteurized.

(7) The discovery of new cases is best accomplished by means of the tuberculin test and the x-ray examination of all positive reactors. If this is done, it is even possible to eliminate the usual physical examination when time is a factor. All child contacts of known sources of infection should be examined repeatedly.

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# Collapse Therapy of the Lungs

IN PRESENTING this paper on the indications for surgical collapse of the lung, only the most important indications and contra-indications for these procedures will be mentioned, that is, the clear-cut indications and contra-indications

BY  
A. A. TOMBAUGH, M. D.\*  
McCorrelsville, Ohio

9 Preparatory pneumothorax on contra-lateral better lung to improve indications for thoracoplasty

This is used as a test measure to thoracoplasty to determine the effect on the contra-lateral lung

10 There are several non-tubercular conditions which will briefly be mentioned 1 Diagnostic tuberculosis as in the case of tumor or abscess of lung 2 Bronchiectasis, especially if the process is unilateral The results are variable, some reporting a high percentage of cure and others recommend other surgical procedures 3 Abscess Good results are obtained if compression is started early before the cavity has become too thick walled 4 Pneumonia, this being a new indication and the number of cases being so few that conclusions should be withheld as to its routine use 5 Acute hemothorax 6 As a preliminary to further surgical procedures

## *Indications for Pneumothorax*

1 Minimal lesions which show signs of progression It is in this type of case that there is much discussion but we believe that the general trend is to use pneumothorax much earlier than a few years ago

2 Hemorrhage which can not be controlled by other means, even though the case is bilateral

3 Unilateral tuberculous pneumonia, within a few days after onset often prevents adhesions and cavity formation

4 Tubercular pleural effusion In this type of case approximately 50% of the fluid should be withdrawn and replaced by air, followed by refills as necessary until the pneumonic process has cleared up

5 Spontaneous pneumothorax may require pneumothorax to maintain a collapse and combat empyema This is especially so in those cases which have only unilateral involvement

6 Chronic unilateral tuberculosis with cavitation Pneumothorax is indicated in this case if they show no signs of improvement after a period of bed rest

7 Bilateral disease with unilateral soft walled cavities If after a period of compression the opposite side shows increased activity a partial reexpansion should be allowed to occur and pressure attempted on the contra-lateral lung

8 Bilateral cases which remain stationary It is in this type of case that the best results from bilateral compression are obtained

## *Contra-Indications for Pneumothorax*

1 Presence of adhesions or thickened pleura

2 Serious tuberculous complications, such as laryngitis and advanced intestinal lesions These, according to some authors, are not contra-indications but usually the advanced intestinal lesion being a definite contra-indication although occasionally a laryngitis will clear up

3 Active process on good side

4 Age From the age of 18 to 35 is the most favorable time for pneumothorax In patients over 45 pneumothorax is definitely contra-indicated except in emergencies such as hemorrhage

5 Organic heart disease except in emergency such as hemorrhage

6 Asthma, Emphysema and Silicosis

7 Extreme emaciation

## *Indications for Phrenicectomy*

1 Positive sputum which can not be controlled by pressure alone

2 Basal lesion This type of lesion is

\*Read before the Annual Meeting of the Eighth District Medical Society, Ohio, June 20, 1935



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most amenable to phrenicectomy if pressure is impossible because of adhesions or thickened pleura

3 An alternative for pneumothorax impossible in view of pleural synthesis

4 Accessory to pneumothorax when cavities are held open by adhesions. Even a slight rise in the diaphragm may cause enough relaxation that by continued pneumothorax a complete closure of the cavity may result

5 Hemorrhage

6 As an economic or compromise measure. In this type of case that can not be hospitalized and can not return at frequent intervals for refills

7 To lengthen intervals between refills

8 As an alternative measure when pneumothorax is refused

9 As a preliminary measure to reexpansion

10 Palliative in cases to relieve cough in far advanced conditions

11 As a preliminary to thoracoplasty

12 Non-tuberculous indications such as bronchiectasis and abscess

#### *Contra-Indications for Phrenicectomy*

1 Rigid walled cavities

2 Acute progression of disease

3 Emphysema

4 Undrained empyema

5 Complicating intestinal tuberculosis and possible laryngeal

#### *Intrapleural Pneumolysis*

This being a secondary operation following attempts at pneumothorax, it is

used to sever adhesions and allow the lung to collapse, the only definite contra-indication being that the large adhesion contains lung tissue or large blood vessels or is close to a lateral cavity

#### *Indications for Thoracoplasty*

1 Sauerbruch ideal indication is unilateral fibrosing tuberculosis with rigid mediastinum, capable heart, youth and good resistance

2 Positive sputum that can not be cleared up with other measures

3 Severe recurrent hemorrhage, uncontrollable by other means, when the source of bleeding is definitely ascertained and the contra-lateral lung does not prohibit

4 Severe unilateral bronchiectasis after failure of other means

5 Selected bilateral cases with retrogressive changes in better lung

6 Unilateral cavitation where pneumothorax or other surgical means have failed or are inapplicable

7 Tuberculous empyema with failure of reexpansion

8 Bronchial fistula

#### *Contra-Indications for Thoracoplasty*

1 Heart and kidney complications

2 Amyloidosis except in mild degree

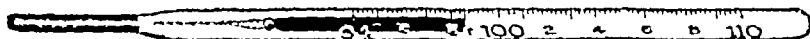
3 Bronchial asthma

4 Advancing bilateral types

5 Diabetes of severe types

6 Neuropsychiatric individuals

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# CASE REPORTS



## *A Clinical Arrest of Unusual Interest*

L B Male, Age 32, Cattleman History of repeated colds for several years, but general health very good In 1927 he suffered an attack of acute respiratory trouble which was diagnosed as influenza He continued to cough following this attack, lost some weight, and did not feel well, but did not consult his physician At times he thought he had some fever, and continued to expectorate a moderate amount of rather thick muco-purulent secretion His own diagnosis was that he had "catarrh"

In June 1928 he was induced to consult his physician who found positive sputum and referred him to us Chest examination revealed extensive active tuberculosis throughout the entire left lung, with one cavity about an inch and a half in diameter, just below the clavicle and another near the base, somewhat larger and apparently situated more to the back of the lung There was some active trouble at the right apex, but no cavitation Stereo X-ray films verified these findings

This patient was advised to carry out a complete bed rest with sanatorium routine until the trouble in the right lung could be controlled, and then have pneumothorax on the left In about four months there seemed to be sufficient improvement on the right side to justify pneumothorax on the left, but the adhesions were so extensive that a monometric reading could not be obtained so pneumothorax was impossible

Since there had been very satisfactory improvement in both lungs up to that time, patient was advised to continue

bed rest treatment in the sanatorium for an indefinite time Such treatment was continued for three years Stereo X-ray films were made at infrequent intervals, each set showing continued satisfactory changes At the end of three years a modified bed rest treatment was continued at home with a gradual increase in up time until in December 1935 when physical signs and X-ray films showed that all evidence of active tuberculosis had disappeared

The patient had been symptom free for several months

In addition to usual sanatorium routine, calcium was administered intravenously throughout the seven years—with occasional periods of rest A preparation of iron was administered intravenously during the first two or three months to correct a secondary anemia

I have reported this case for the purpose of recalling the fact that many patients will eventually secure an arrestment of even far advanced tuberculosis if they continue to carry out the proper regime for a sufficient length of time Neither the physician nor the patient should become discouraged when it is found that pneumothorax is out of the question and the patient is not in proper condition for more extensive chest surgery, or if he objects to that line of treatment

Many patients have a greater resistance to tuberculosis than we realize and should usually first be given a chance to carry out a routine rest treatment unless there are some conditions in that particular case which make it inadvisable to do so

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# THE LIMITATIONS OF PHYSICAL SIGNS IN THE DIAGNOSIS OF PULMONARY TUBERCULOSIS

(Continued from page 13)

preventive medicine! I might quote in closing the dictum of Dr James Alexander Miller "Early tuberculosis must be seen and not heard!"

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## PULMONARY EMPHYSEMA

(Continued from page 11)

advocated by Alexander and Kountz (9), also by Meakins and Christie (10) in order to elevate and convert a flattened, immobile diaphragm into a rounded and functioning one, increasing vital capacity and relieving dyspnoea. To accomplish this the belt must be so arranged that it produces an upward pressure, low in the abdomen, actually elevating the position of the diaphragm. These observers report improvement of dyspnoea in the majority of cases.

However, comparatively little can be accomplished, generally speaking, in the treatment of pulmonary emphysema. The sufferer is severely disabled and handicapped. We can only hope to prevent the progression of the disease and to make our patient's existence more comfortable.

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# ABSTRACTS



STURGIS, CYRUS C An Appraisal of the Methods of Treating Pneumonia Journal of the Michigan State Medical Society, 34 59-64 (February) 1935

The author discusses the value of the following therapeutic agents in the treatment of lobal pneumonia

- 1 Antipneumococcus serum
- 2 Digitalis
- 3 Oxygen
- 4 Morphine

5 A miscellaneous group of drugs which are alleged to be of specific or symptomatic value

Antipneumococcus Serum — Felton's antipneumococcus serum is very satisfactory for use in patients who have pneumonia in which the Type I and II pneumococcus is the cause of the disease. So far there is no therapeutically active serum for Group III or IV. Serum treatment is much more effective when given within 96 hours after the initial symptoms of the disease have appeared. Any practitioner with very little special training can apply this type of treatment in such an efficient manner that, in Type I pneumonia at least, the mortality rate may be reduced more than one-half.

It should be emphasized that when certain circumstances prevail, the initial dose of the serum may be given before the type for the disease is determined. This is logical in certain patients who are critically ill when first seen and it appears urgent to begin the treatment at the earliest possible moment and thereby avoid the delay of some hours which is required in order to type the organism. These patients should be given an initial dose of a polyvalent antipneumococcus serum which is now available and is potent against Type I and II pneumococcus infections. Inasmuch as these two groups are responsible for over 50 per cent of all pneumococcus infections of the lungs, the chances are more than equal that an effective type of treatment will be applied. If subsequent typing of the sputum shows that the

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etiologic agent belongs to one of the other groups, the serum treatment should, of course, be discontinued

Serum should not be administered without preliminary tests to determine if the patient is sensitive to this type of serum

**Oxygen Therapy** — Anoxemia occurs frequently in pneumonia and it may be eliminated by the proper oxygen therapy. The beneficial effects of oxygen therapy in pneumonia are shown by the following changes

- 1 The patient is more comfortable as a result of quieter breathing

- 2 The tachycardia is lessened and frequently there is a drop in body temperature and a slowing of the respiratory rate

- 3 The arterial saturation is increased and the cyanosis disappears

- 4 There is every reason to believe that life is prolonged and a longer period is thereby given for immunity processes to develop

If oxygen therapy is to be used, it is essential that it should be instituted early in the course of the disease at a time when the earliest evidence of cyanosis appears. Furthermore, it should be continued for some time after it has completely disappeared

**Digitalis** — In patients with a heart of normal size, and this is usually the case in lobar pneumonia, the effect of digitalis is to decrease the volume output of the heart. This is because the heart is contracted to an inefficient size and although the strength of the shortened stroke is increased, the result is that the volume output of the heart falls. If digitalis in full

therapeutic doses is given to the usual patient with pneumonia, therefore, it will cause a decrease in cardiac output and a resultant deleterious effect. On the other hand, if a patient has a hypertrophied heart, the drug causes it to decrease to a more efficient size and this, with the increase in the strength of the stroke, causes an increase in the cardiac output. The indication for digitalis therapy in patients with lobar pneumonia, therefore, is a heart which is larger than normal or in the presence of auricular fibrillation or auricular flutter, and these two types of arrhythmia are estimated to occur in only about 5 per cent of all cases

**Miscellaneous Drugs** — The only drugs which the author has found to be of service in the treatment of lobar pneumonia are those which secure rest for the patient and relieve pains. Of greatest value are the hypnotic drugs, such as the barbituric acid derivatives, whether alone or in combination with codeine. If these preparations fail to secure rest, he does not hesitate to turn to the judicious use of morphine. Morphine is indispensable in some cases but it should be used only when other sedatives and hypnotics fail, and then with great discrimination. The untoward effects of morphine are sometimes very slight, but if cyanosis is marked and breathing labored, its depressing effect on the respirations may be minimized by administering  $7\frac{1}{2}$  grains of caffeine sodium benzoate intramuscularly or by placing the patient in an oxygen tent in which a 5 per cent carbon dioxide mixture is maintained as a stimulant to the respirations

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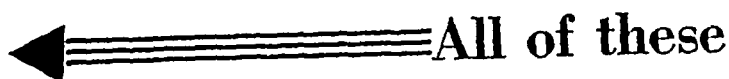
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